THE METAL INDUSTRY
WITH WHICH ARE INCORPORATED
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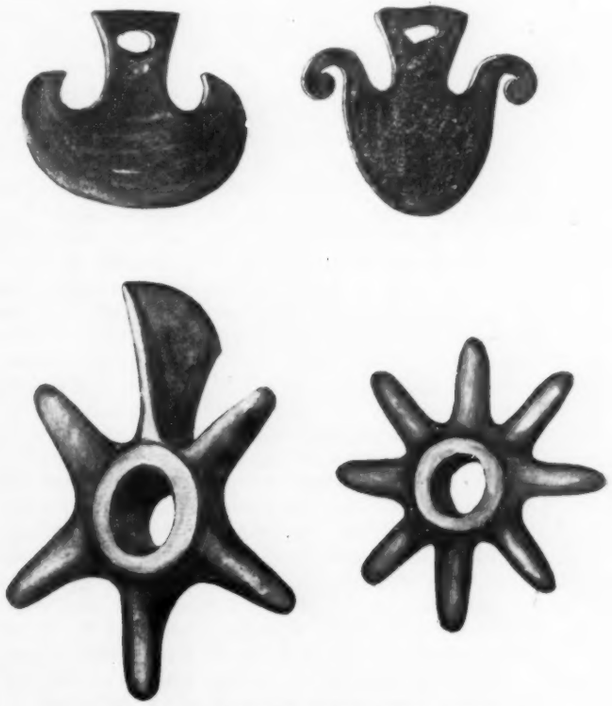
THE ANCIENT METAL WORKERS OF PERU.

By Oswald H. Evans, F. C. S.

Of late years a good deal has been written about the early metal work of the European, Asiatic and Egyptian peoples, and our knowledge of their metallurgy has been greatly increased, thanks to the unceasing studies carried out by so many learned societies by excavation on the sites of prehistoric settlements.

At the present day, nevertheless, a vast field remains to be explored in the innumerable relics of vanished civilization, or semi-civilization, developed ages ago on the American continent.

SILVER DRINKING CUP FROM CHIMU, PERU.



BRONZE OBJECTS FROM CHIMU, PERU.

In the United States, a fine work has been accomplished, not only under official auspices, but also by a host of private students, with the result that our information about the state of the arts in North America in he time before the coming of the white man is, if by no means complete, at any rate in a very satisfactory condition.

Unfortunately, the same remark cannot be made with reference to South America. Hitherto, the governments of the southern republics have shown no great disposition to embark funds in so little remunerative a speculation as the investigation of the private life of the Indian population in pre-European times. There are signs, however, of a wholesome change in this attitude; during the last few years the work of the Peruvian national museum, at Lima, under the direction of a celebrated German ethnologist, has been fruitful in results and promises for the future a rich harvest of valuable and interesting discovery.

It may be of some interest to the readers of The Metal Industry to present in brief an outline of the condition of metallurgy in that, in some respects, most remarkable of departed civilizations, developed long ago in Peru, and now almost utterly destroyed. This is not the place to enter upon any discussion of the different cultural elements which went to the making of the Inca Empire; let it suffice to say, that at the time of the Spanish invasion, a long period of

conquest appears to have resulted in the spread of a fairly uniform culture over a vast area west of the Andes. The evidence to-day tends to prove the passing of many civilizations on Peruvian soil, and to push back into a remote past the dawn of the "metal age" throughout this region.

The first striking fact to be noted is that the early Peruvians had no knowledge of iron. Enormous deposits of excellent ore occur in a readily accessible form within the bounds of their territory, but its use remained sealed from them, and this ignorance prevented a very intelligent and enterprising people from emerging out of semi-barbarism. Nowhere in the world, I suppose, are the ores of copper so widely diffused as throughout the mountain chains of western South Africa, the name "Andes" itself being supposed to mean "copper" in the Quichua language still spoken in parts of Peru. The beautiful metal not infrequently occurs native in masses of considerable size, and in many localities the surface ores carry a high percentage value in a form readily amenable to the crudest methods of smelting.

In ancient mine workings showing traces of pre-Spanish Indian activity, there is good evidence to show that the ore was quarried out very roughly, the miner following only the richer portions of the vein, whilst all save the best samples were rejected by the smelter.

The implements employed in extracting the ore were of a very primitive description, consisting for the most part of hammers of hard stone, to which handles of flexible cane were attached by means of strips of llama hide. The present writer has seen such hammers found in old workings, their striking ends much battered, and stained green by the copper ore.

Peru, except in the fertile river valleys, where in the past almost every foot of ground was brought under intensive cultivation by means of an elaborate system of irrigation, is a barren land, yielding but little fuel. The lack of this important commodity is supplied to some extent by dried cactus, which has been used for smelting copper down to, within comparatively recent times, and by dried llama's dung, still employed in Bolivia for metallurgical operations in the absence of fuel of higher calorific value.

Furnaces were constructed of "adobe," or its Puruvian equivalent, and can scarcely have survived a protracted smelting campaign. A form of artificial blast appears to hae been used; this is known to have been the case in their furnaces for smelting silver ores, but the perishable nature of the material of which they were constructed leaves much uncertainty as to the details.

A very imperfect separation of the metal from its gangue was obtained, samples of slag frequently containing a high percentage of wasted copper. Oxidized and carbonated ores were alone treated, no attempt being made to utilize sulphides for centuries after the Spanish occupation. It is probable, indeed, that the earlier peoples had no knowledge of the enormous wealth of copper their land possessed locked up in the form of copper pyrites.

The greater part of the copper was converted into bronze by alloying it with tin, and in this state worked up into innumerable utensils for domestic purposes, agriculture, war, the chase and personal adornment. Copper implements, nevertheless, are not infrequently found associated with those made of bronze, thus affording no evidence of a period when the alloy was unknown, whilst the origin of the knowledge of bronze in the New World remains shrouded in much the same mystery as it does in other parts of the globe.

The necessary tin was probably obtained from the rich deposits of the Bolivian mountains, at that time well within the bounds of Inca dominion. A remarkable uniformity exists in the proportions of tin and copper used in making up the alloy in Peru and Europe, about nine parts of copper and one part of tin being usually put into the crucible. The greatly exaggerated accounts which still crop up occasionally, of the steel-like temper of ancient bronze implements have no foundation whatever in fact. The same stories are told the wide world over, "from China to Peru."

Elaborate carvings in hard rock are sometimes pointed out as evidence that the natives must have possessed tools equal to those in use at the present day, but this argument neglects the almost unlimited time at the disposal of the early sculptor, and the extent to which resource was had to a tedious process of grinding.

There can be no doubt as to the efficiency of the weapons turned out in the workshops of the Peruvian armorers, and the possession of bronze contributed greatly to the success with which war was carried on against surrounding peoples still in the stone age. On some of the finely painted pottery found in the ruins of the coast town of Chimu, vivid battle scenes are depicted in which the Chimu warriors lay about them in fine style with bronze maces such as are frequently discovered in the tombs and dwelling houses. In the same towns some interesting ruins may still be seen which show that the metal workers of the community worked in a quarter of their own, crumbling furnaces, accumulations of slag and numerous articles in an unfurnished condition attesting their industry.

As regards the method of working, many of the articles were beaten into shape from flattened sheets, and the designs commonly produced by hammering from the back and finishing with the engraving tool; but the art of casting had reached a high degree of excellence. Good examples, particularly of the work of the coast tribes, are much sought after, and in consequence, the market is abundantly supplied with forgeries. The trade in antiques flourishes, a favorite commodity being a rather battered mummy. "Observe, Señor, that his mouth is sewn up, and at the same time do me the favor of remarking the fact that I have not attempted to open it. It was a custom, Señor, among these infidels to place jewels and other articles of immense value in the mouth of the dead, so that in offering this remarkable curiosity at so absurdly low price, etc."

It does not appear, however, that any purchaser has been enriched by this promising speculation.

Peru to-day produces a great part of the world's supply of silver, and this metal was extracted from its ores by the former inhabitants who applied it to the manufacture of ornaments and in decorating their palaces and temples. Cups representing human heads and faces form very typical objects in silver, their peculiar shape perhaps representing a survival from some more savage time when the actual skulls of the slain served as dringing vessels for the victors.

"All the riches of Peru" was a common figure of speech a century or so ago. The immense booty in precious metals captured by the Spanish Conquerers when they looted the treasures of the Incas, and the enormous revenue long derived by Spain from the

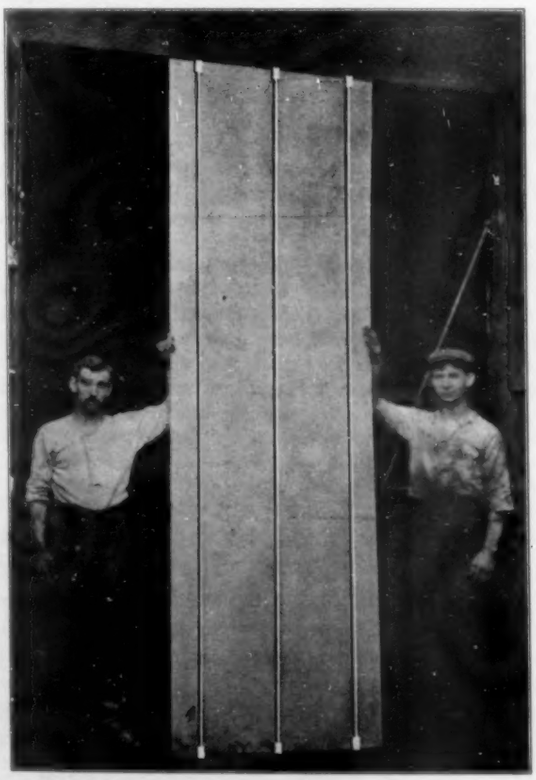
forced labor of thousands of unhappy Indians in the mines, made the mineral wealth of the country a by-word throughout the world. Scarcely a river in this region fails to show at least "colors" of the yellow metal on washing, and it was from the river beds that the bulk of the riches of the Indian rulers was won by laborious and primitive methods. According to the Inca system, all the gold in the country belonged of right to the supreme ruler in his capacity of child of the sun, to which deity gold was held sacred, and only by special grace could a private person make use of it in any manner. It is little wonder, therefore, that immense accummulations were hoarded up, and that an abundant supply was available for the purposes of an artist working under royal patronage. Whilst an element of perhaps unsconscious exaggeration very possibly entered into the glowing accounts of the "Conquistadors," there can be little doubt that the metal workers attached to the court were skilful in their art, indeed, although the melting pot has swallowed all save a small proportion of the treasure trove which has at one time or other come to light, enough remains preserved in museums and in the hands of private collectors to indicate clearly that in pre-Spanish times the Peruvians had travelled far beyond the rudiments of the craft.

It would be difficult to enumerate the wide range of uses to which this almost unparalleled profusion of the rare metal lent itself. We read in the narratives of the followers of Pizarro, written for the most part in after years when the sword and morion were laid aside, of the splendor of the now desolate temples, their walls ablaze with golden-plates and massive images of the sun-god, and of the Inca's gardens wherein the flowers were all fashioned in refined gold. Perhaps when these tales were written, the coloring was heightened to suit the taste of a new generation to whom the past had already become a legend of romance.

Enough has been said to point out the existence in ancient Peru, and more especially among the peoples dwelling near the coast, of a true "metal age," a phenomenon almost unique upon the American continent. When amongst other peoples the knowledge of metals had but rarely got beyond the utilization of masses of native copper hammered into tools or weapons, or of gold found in the stream beds, the cultured nations dwelling between the Andes and the Pacific coast showed their familiarity with a great number of metallurgical processes, and that they worked in the dawn of an artistic perception worthy of the beautiful materials in which they wrought.

LARGEST ALUMINUM PLATE EVER CAST.

The accompanying engraving shows an aluminum casting recently made by the Sheeler-Memsher Company, of 811-815 Fairmount avenue, Philadelphia, Pa. This is believed to be the largest plate of this thickness that was ever cast in aluminum. It measures 10 feet long, 3 feet wide and only ¼ of an inch in thickness. There are three ribs running its entire length, ½ x ½ inch, making the total weight 115 pounds.



LARGEST ALUMINUM PLATE EVER CAST.

This casting came out perfect in every respect, without spot, blemish, or crack.

ALUMINUM COMPETITION IN GREAT BRITAIN.

At present the aluminum industry in Great Britain is suffering from the general business stagnation, which is so universal, and from the active competition of several new aluminum companies. The new competition is one of the causes of aluminum hard times from the standpoint of the producer. The competition has come about through the expiration of aluminum patent rights and the consequent over-production. The lack of a ready market has had the effect of reducing the price for the metal to 16 cents per lb., American money. From a consumer's standpoint this may be very desirable, but the producers assert that the price is down to very nearly an unprofitable figure. The situation heretofore has been that there has been one company in each of the following European countries which country controlled its own market, viz.: Great Britain, France, Switzerland (which included Germany), and Austria. In the past year there has sprung up one new company in Great Britain, two in France and one in Italy, making four new aluminum producers in all and all of them starting at a time when business is universally dull and also at the very time that the existing producers had, through extensive enlargements, been able to take care of their own markets. Some of the established plants had even doubled their capacity in order to meet the demand. However, despite the unsatisfactory conditions at present, the old aluminum company of Great Britain looks on the state of affairs with equanimity and believes that in time the production and competition will take care of itself.

With this belief the British Aluminum Company have raised £700,000 to enlarge their various works and will shortly manufacture in addition to aluminum, carbide and two other electro-chemical products. They now own water powers aggregating 60,000 horse

power; 45,000 of this is in Scotland and 15,000 in Norway and Switzerland. Their Scotch water power has a sea connection, therefore vessels of the largest tonnage can land at the company's docks. They are planning especially to take care of the prospective business for electrical conductors, believing that British engineers will take up aluminum for this purpose in the near future. Their present water power is the largest in the United Kingdom. Their Bauxite deposits are in Ireland and France. Their reduction works are in the countries mentioned, and their rolling mill is at Milton, near Stoke-on-Trent. Their authorized share capital is £1,300,000, and their managing directors, John D. Bonner (chairman), E. E. Sawyer and A. J. Sharwood, are constantly engaged in furthering the interests of the company.

MACHINE FOR EXTRUDING METALS.

It is a well known fact that certain metals and metallic alloys can only be extruded when at certain temperatures. It is therefore important to provide means for maintaining the initial temperatures of such bodies while in the container and during the act of extrusion. This is accomplished by an invention patented July 21, 1908, by George William Benjamin, and assigned to the Coe Brass Manufacturing Company, Torrington, Connecticut.

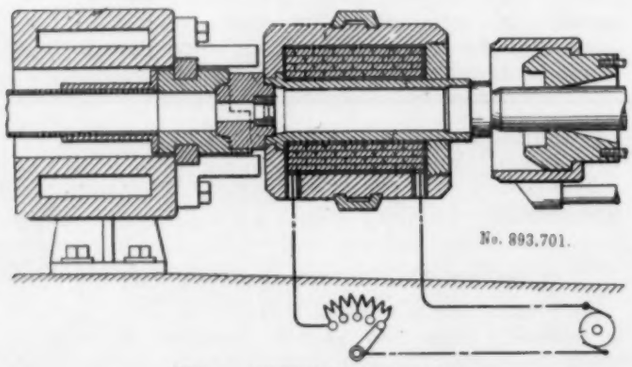


FIG. 1. EXTRUSION MACHINE.

Of the drawing Fig. 1 is a longitudinal section of the container and adjacent portions of the machine, and Fig. 2 is a transvere section. The container is formed of an interior cylinder, an exterior cylindrical casing and intermediate layers of metallic tape. The cylinders, die and the ram may be made of metal, glass or other substance which may be heated to a high temperature and yet have sufficient strength to prevent their distortion during the extrusion operation. The tape may be of iron, copper, or an alloy. The ends of the tape are carried out of the container and connected to the terminals of an electric generator. The tape is insulated so as to resist high temperature.

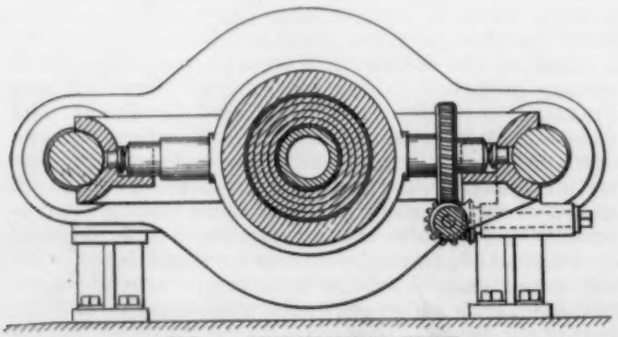


FIG. 2. EXTRUSION MACHINE.

In order to heat the billet, the plunger and die are connected to the terminals of the generator. The interior cylinder of the container in such case is insulated from the outer containing cylinder.

The operation of the device will be readily understood. When the current is transmitted through the tape heat is generated and this heat serves to prevent the absorption of heat by the container, the die, or the plunger from the billet which is being extruded; the temperature of the billet will, therefore, be maintained. When current is sent through the billet in sufficient quantity it will be heated. It will be seen that the design is such that the parts with which the billet comes in contact are uniformly heated to a temperature equal to that of the initial temperature of the billet.

METALLIC WALL PAPER.

The eminent British metallurgist and inventor, Sherard Cowper-Coles, reports more or less progress in the various metallurgical processes that he has invented. Mr. Coles is not taking an active part in his Sherardizing or dry-galvanizing process—that being left to the respective companies which have been formed in Great Britain, Germany and the United States, the progress of which has been reported in THE METAL INDUSTRY from time to time. Mr. Coles has recently arranged with Helnan and Froude of Worcester, England, to make on a royalty basis his metallic sheet wall paper, which has already been illustrated and described in THE METAL INDUSTRY. This wall paper is manufactured from sheet copper and it is expected that there will be a large market for it in the lining of railroad coaches and for steamers. It is, of course, fireproof and, it is believed, will become a substitute for wood panelling. The manufacture of this wall paper is a continuous operation, an electrolytic process, and can be produced quite cheaply. The company named is to push the product. Another corporation of Mr. Coles' is the Metals Ornamentation Company, Ltd., formed to manufacture and market his metallic ornaments, which ornaments consist of the inlaying of zinc on various metals. Besides these products mentioned, Mr. Coles has several others under way, which he believes will be useful processes in the metal arts.

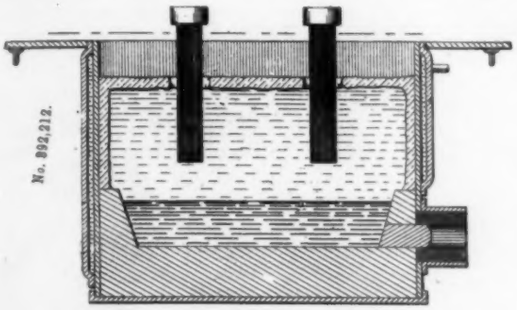
ALUMINUM.

Some interesting information was given on the aluminum industry by Sir James Sivewright, presiding at the general meeting of the Aluminum Corporation. His firm in March last tapped furnaces at Newcastle-on-Tyne producing high-quality metal containing never less than 99 per cent. of pure metal. They were now turning out metal from their North Wales works at the rate of 1,500 tons per annum. Although aluminum had now dropped to £80 per ton, they surveyed the future with equanimity, and would be able to pay substantial dividends and made good profits. There was a vast future for aluminum, which would in many respects take the place of copper, and the drop in prices from £3,000 per ton in 1889 had not been an unmixed evil inasmuch as it had broadened the basis of their operations.

ELECTRIC FURNACE METHOD.

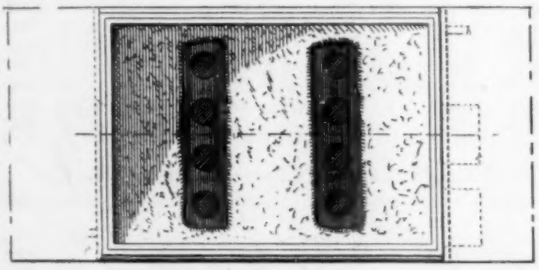
The object of an invention patented by Frederick M. Becket, of Niagara Falls, N. Y., June 30, 1908, and by him assigned to the Electro Metallurgical Company, a corporation of West Virginia, is to provide an efficient electro heating furnace for handling such refractory metals as chromium, molybdenum, tungsten, vanadium, and thenr alloys with iron, nickel, etc.

The inventor states that he has discovered that by a



ELECTRIC FURNACE—SECTION.

proper adjustment of certain conditions it is possible to conduct electric furnace operations involving either the production of alloys or metals, while maintaining upon the surface of the bath a solid crust of sufficient thickness to materially reduce the loss of heat by radiation, thereby conserving the heat of the furnace and increas-



ELECTRIC FURNACE—PLAN.

ing the efficiency of the operation. By properly proportioning the cross sectional area of the depending electrodes to the current employed, these may be so heated as to prevent the crust from forming over the portions of the bath immediately adjacent the electrodes, thus providing openings or apertures in the crust which permit the charge to be supplied or stoked, and also provide for the escape of gases or volatile reduction products.

The essential conditions of operation comprise an adjustment between the current density or heat development in the molten bath or slag and the composition or fusibility of this bath, these factors being so related that the temperature of the upper portion of the bath in contact with the atmosphere will permit the formation of the crust mentioned. In this crust apertures, located at any desired point or points, may be provided and kept open by any desired means, as by local heating or by simple manual methods, preferably however these apertures are maintained by local heating applied through some or all of the working electrodes.

The Daily Consular and Trade Reports states that some very rich copper and silver mines have been discovered in the department of Loncomilla, about halfway between Santiago and Concepción. It is said that some of the copper ore runs as high as 42 per cent. pure copper.

MAGNESIUM IN ZINC PLATE, NICKEL, BRASS AND COPPER-ZINC WORK.

By C. W. L.

Manufacturers of zinc plate, nickel, brass and copper-zinc plate, who are anxious to avoid porous plates, should investigate the merits of magnesium metal in that line of work. The cause of the porus plates can be partly attributed to the fact that the zinc baths oxidize during the process of melting and partly because the sheet bars are not handled properly during the casting as well as before rolling. This drawback is noticed in the further working up of the zinc plates and of the zinc plates electroplated with nickel, brass or copper.

In order to get the best results, the following suggestions are offered: First, the zinc bath must be suitably deoxidized; and for that purpose pure magnesium metal in the form of a magnesium-zinc alloy should be used, viz.:

After the zinc has been melted, the quantity required for sheet bars is drawn off in a suitable casting crucible and then the magnesium is added by means of a pair of graphite pincers or tongs, and pushed to the bottom of the crucible, all the while keeping up a steady stirring motion. About 100-300 grams of magnesium-zinc should be used for each 200 pounds of zinc. After the magnesium has been added, the surface of the bath should be subjected to a complementary deoxidation by strewing upon same a mixture of chloride of ammonia (2 parts) and chloride of magnesium (1 part).

The bath should be then stirred and skimmed in the usual manner and then cast in iron ingot molds standing upright, which are kept in readiness at a low dark red heat. The interior sides of the mold can be made by inserting 8% aluminum-bronze sheets, ten millimeters thick. As a coating a graphite wax paste should be used, 3 parts yellow wax and 1 part washed graphite. The wax is carefully melted and the graphite added, and the whole poured into a form made out of plate in order to cool off.

It is necessary that the fluid zinc be cast in the mold through a suitable oval graphite or iron funnel, so that the fluid metal can flow down perpendicularly in the middle of the mold. Should an iron funnel be used, the inside must be rubbed with a mixture of 3 parts fire-clay, 1 part slate flour and 1 part of flour made from broken crucibles. A slit 7 to 10 millimeters wide should be made at the bottom of the funnel. The length of this slit depends on the width of the ingot mold, but about 30 millimeters must be kept closed on both ends of the slit.

When cold the broad sides of the bars are turned off in order to obtain a perfect surface.

U. S. PRODUCTION OF SPELTER IN 1907.

An advance report from the United States Geological Survey states that the production of spelter last year in this country amounted to 249,860 tons, an increase of 11.2 per cent. over the previous year. The consumption for the same period was 228,509, an increase of 3 per cent. The production of spelter in the world was 813,842 tons, an increase of 4.9 per cent.

Missouri led with a production of 141,824 tons; Colorado was second with 26,077 tons, and Wisconsin next with 15,273 tons.

The twelve gold mining companies in the Mysore State, India, produced $10,354,773 of gold for the year ended June, 1907, compared with $11,373,930 during the previous year. The State royalty in 1906-7 was $517,842. Chrome mining promises to develop into an important industry in Mysore, various deposits of the ore having been located from time to time.

THE TURRET LATHE AND ITS EQUIPMENT.

By Easy Way.

(Contined from May Issue.)

Feeds and Speeds.

The following tables of feeds and speeds used on screw machines for different types of tools for work on brass castings and rods, phosphor-bronze and nickel alloys, have been thoroughly tested. They can be applied to the hand as well as to the automatic machines and have proved of value in both cases. This statement applies to the hand machine although naturally the matter of feeds on the latter is regulated by the operator. The pulleys on the counter and line shaft are selected to determine the surface speeds and the rates at which to drive the spindle in order to approximate closely the desired surface velocities.

FEEDS AND SPEEDS FOR TURNING.

Table 1 covers feeds and speeds for brass castings with various depths of chip (that is stock removed on a side) from 1/32-inch to ⅜-inch. These feeds, speeds and depths of cut are figured more especially for such tools as roughing box tools where the cut, though frequently heavy, is taken by a single cutting edge, the work being well supported by the bushing in the box during the operation.

CUTTING SPEEDS AND FEEDS FOR BRASS CASTINGS.—TABLE No. 1.

1/32" CHIP.				1/16" CHIP.				⅛" CHIP.			
Dia. of Stock.	Feet Surface. Speed.	Revs. Per Minute.	Feed Per Rev.	Dia. of Stock.	Feet Surface. Speed.	Revs. Per Minute.	Feed Per Rev.	Dia. of Stock.	Feet Surface. Speed.	Revs. Per Minute.	Feed Per Rev.
⅛"	180	5500	.003	¼"	180	2748	.004	⅜"	165	1680	.004
3/16"	180	3668	.004	⅜"	180	1833	.005	½"	165	1260	.006
¼"	180	2748	.005	½"	180	1374	.006	¾"	165	840	.007
⅜"	180	1833	.006	¾"	165	840	.008	1"	150	573	.008
½"	180	1374	.008	1"	165	630	.009	1¼"	150	456	.009
¾"	180	915	.010	1¼"	165	504	.010	1½"	135	342	.010
1"	180	687	.011	1½"	150	381	.012	1¾"	135	294	.010
1¼"	180	549	.012	1¾"	150	327	.012	2"	120	228	.011
1½"	150	254	.014	2"	135	258	.014	2¼"	120	204	.011
1¾"	150	218	.014	2¼"	135	228	.014	2½"	120	183	.012
2"	150	190	.015	2½"	135	204	.014	2¾"	120	153	.012
2¼"	150	170	.015	3"	135	171	.014	3"	120	145	.014
	3/16" CHIP.				¼" CHIP.				⅜" CHIP.		
½"	150	1146	.005	¾"	150	762	.005	1¼"	135	411	.007
¾"	150	762	.006	1"	150	573	.006	1½"	135	342	.008
1"	150	573	.007	1¼"	135	411	.007	1¾"	135	294	.008
1¼"	135	411	.008	1½"	135	342	.008	2"	120	228	.009
1½"	135	342	.009	1¾"	135	294	.008	2¼"	120	204	.009
1¾"	135	294	.009	2"	120	228	.009	2½"	120	183	.010
2"	120	228	.010	2¼"	120	207	.009	3"	120	153	.010
2¼"	120	204	.010	2½"	120	183	.010	3½"	120	131	.010
2½"	120	183	.010	2¾"	120	153	.010	4"	120	114	.010
3"	120	153	.010	3"	120	131	.010	4½"	120	102	.010

SPEEDS AND FEEDS FOR HOLLOW MILLS ON BRASS CASTINGS.—TABLE No. 2.

1/32" CHIP.				1/16" CHIP.				⅛" CHIP.			
Dia. of Stock.	Feet Surface Speed.	Revs. Per Minute.	Feed Per Rev.	Dia. of Stock.	Feet Surface Speed.	Revs. Per Minute.	Feed Per Rev.	Dia. of Stock.	Feet Surface Speed.	Revs. Per Minute.	Feed Per Rev.
⅛"	180	2445	.004	¼"	160	916	.006	⅜"	155	560	.0067
3/16	170	1426	.0054	⅜"	160	611	.0065	½"	155	420	.008
¼"	170	1069	.0067	½"	160	458	.008	¾"	155	280	.0093
⅜"	170	719	.008	¾"	155	280	.0093	1"	150	191	.0106
½"	160	458	.0093	1"	155	210	.0106	1¼"	150	152	.0106
¾"	160	305	.0106	1¼"	155	168	.0119	1½"	145	114	.0106
1"	160	220	.0119	1½"	150	127	.0119	1¾"	145	98	.0106
1¼"	160	183	.0132	1¾"	150	109	.0132	2"	140	76	.0119
1½"	150	127	.0145	2"	145	86	.0132	2¼"	140	68	.0119
1¾"	150	109	.0145	2¼"	145	76	.0132	2½"	140	61	.0119
2"	150	95	.0145	2½"	145	68	.0132	3"	140	51	.0119
2¼"	150	85	.0145	3"	145	57	.0132	3½"	140	41	.0119
	3/16" CHIP.				¼" CHIP.				⅜" CHIP.		
½"	155	426	.0067	¾"	150	254	.0067	1¼"	145	137	.008
¾"	155	280	.008	1"	150	191	.008	1½"	145	114	.008
1"	155	210	.008	1¼"	145	137	.008	1¾"	145	98	.008
1¼"	150	152	.0093	1½"	145	114	.0093	2"	140	76	.0091
1½"	150	127	.0093	1¾"	145	98	.0093	2¼"	140	68	.0091
1¾"	150	109	.0093	2"	140	76	.0093	2½"	140	61	.0091
2"	140	76	.0106	2¼"	140	68	.0106	3"	140	51	.0091
2¼"	140	68	.0106	2½"	140	61	.0106				
2½"	140	61	.0106	3"	140	51	.0106				
3"	140	51	.0106								

Table 2 covers the same range of brass casting work as Table 1, but is laid out for hollow mill operations. It will be noticed that as the cut is divided with this tool among three or more cutting edges, coarser rates of feed are provided for than with the box tool. With both classes of tools the feeds are, of course, increased as the diameter of the stock increases, the peripheral speeds being reduced as the feeds grow coarser and the chips greater in depth.

crowding, as a rule, than either narrower or wider tools. Thus we see the rate of feed drops off as the tool narrows to 1/16-inch, which obviously is too thin a cutting device to admit of taking much of a chip. Also as the width of the chip increases above, about 3/16 or ¼-inch, the rate of feed must again be diminished to give the best results. Naturally, other things being equal, the greater the diameter of the section formed the coarser the feed which can be

SCREW MACHINE WORK.

CUTTING SPEEDS AND FEEDS FOR FINISH BOX TOOL.—TABLE No. 3.

Finished Dia. of Work.	Brass Casting. Feet Surface Speed.	Brass Casting. Revs. Per Minute.	Brass Casting. Feed Per Rev.	Brass Rod. Feet Surface Speed.	Brass Rod. Revs. Per Minute.	Brass Rod. Feed Per Rev.	Phosphor Bronze. Feet Surface Speed.	Phosphor Bronze. Revs. Per Minute.	Phosphor Bronze. Feed Per Rev.	Nickel Alloy. Feet Surface Speed.	Nickel Alloy. Revs. Per Minute.	Nickel Alloy. Feed Per Rev.	Amount Advisable To Remove On a Side.
1/16"	180	4889	.003	180	11000	.003	..	..	..	40	2445	.002	.002
⅛"	180	2445	.0045	180	5500	.0045	..	..	..	40	1222	.003	.0025
3/16"	170	1426	.0055	180	3668	.0055	70	1426	.0055	40	815	.003	.0025
¼"	165	993	.0075	180	2750	.0075	70	1069	.0075	35	531	.004	.0045
½"	160	458	.011	180	1375	.011	65	496	.011	35	267	.005	.006
¾"	160	305	.012	180	917	.012	65	331	.012	35	178	.007	.006
1"	160	229	.012	175	668	.012	60	229	.014	30	115	.009	.0065
1½"	155	146	.014	170	433	.014	60	153	.016	30	76	.009	.007
2"	150	95	.014	170	325	.014	60	115	.016	30	57	.009	.008

SPEEDS FOR FORMING TOOLS.

TABLE No. 4.

Dia. of Work.	Brass Casting. Feet Surface Speed.	Brass Casting. Revs. Per Minute.	Brass Rod. Feet Surface Speed.	Brass Rod. Revs. Per Minute.	Phosphor Bronze. Feet Surface Speed.	Phosphor Bronze. Revs. Per Minute.	Nickel Alloy. Feet Surface Speed.	Nickel Alloy. Revs. Per Minute.
⅛"	185	2297	210	6122	..	..	..	..
3/16"	185	1533	210	4079	..	..	..	..
¼"	180	1074	195	2832	80	1155	45	688
⅜"	175	667	195	1894	75	724	40	407
½"	175	502	195	1424	75	545	40	906
¾"	170	310	185	896	70	350	35	178
1"	170	234	185	677	70	255	35	134
1½"	170	158	180	445	70	160	30	76
2"	170	100	180	337	65	125	30	57

SPEEDS FOR STANDARD THREADING.

TABLE No. 5.

Diameter Of Thread.	Brass Casting. Feet Surface Speed.	Brass Casting. Revs. Per Minute.	Brass Rod. Feet Surface Speed.	Brass Rod. Revs. Per Minute.	Phosphor Bronze. Feet Surface Speed.	Phosphor Bronze. Revs. Per Minute.	Nickel Alloy. Feet Surface Speed.	Nickel Alloy. Revs. Per Minute.
⅛"	120	3676	175	4135	40	1222	25	764
¼"	115	1690	135	1920	40	611	25	382
⅜"	105	1030	130	1235	35	356	20	204
½"	105	775	125	927	35	267	20	153
¾"	105	520	120	596	30	153	20	102
1"	95	350	115	430	30	115	20	76
1¼"	95	285	105	316	25	76	15	46
1½"	95	240	95	239	25	64	15	38
2"	90	183	90	172	20	38	15	29

FEEDS FOR FORMING TOOLS.

Width of Form.	SMALLEST DIAMETER OF FORM. 1/16"	⅛"	3/16"	¼"	⅜"	½"	¾"	1½"
1/16"	.0012	.0013	.0015	.0017	.0017	.0017	.0017	.0017
⅛"	.001	.0013	.0015	.0017	.002	.0025	.003	.003
¼"		.0012	.0015	.0015	.002	.002	.0023	.0023
⅜"			.0014	.0014	.0015	.0017	.002	.002
½"			.0013	.0013	.0015	.0015	.002	.002
¾"					.0014	.0015	.0016	.0017
1"					.0013	.0014	.0015	.0017
1½"					.0012	.0012	.0014	.0016
2							.0012	.0015

Table 3 gives the feeds and speeds for finishing box tools, as used on different materials, the last column indicating the amount of stock which, generally speaking, it is advisable to remove in order to produce a good surface.

FEEDS AND SPEEDS FOR FORMING TOOLS.

Table 4 gives the feeds and speeds for forming tools, the widths covered here ranging from 1/16-inch to 2 inches, and the diameters from 1½-inch down to 1/16-inch. It will be seen that a tool about ⅛-inch wide is adapted to take the coarsest feed; tools from this width up to about 3/16-inch (such as are commonly used for cutting-off purposes), admit of heavier taken economically. This is also indicated by the figures in the table.

THREADING SPEEDS.

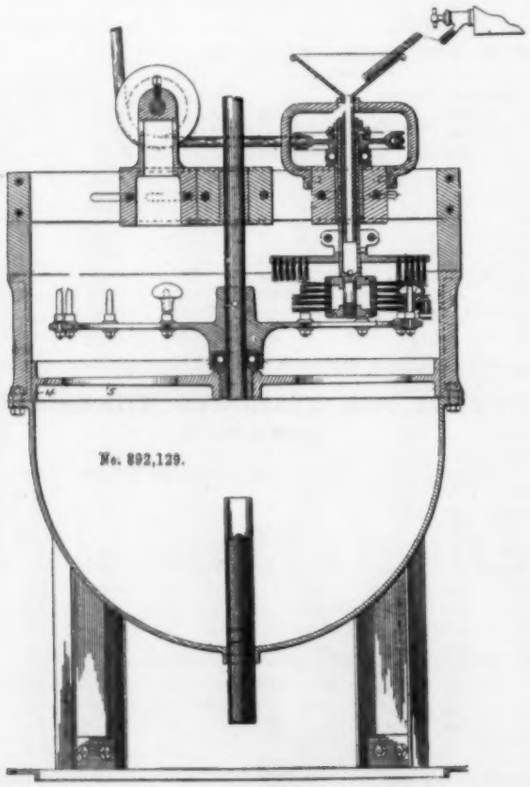
Table 5 explains itself, and while giving speeds for threading with dies, should be of equal value in establishing speeds for tapping.

It is not expected that the speeds and feeds laid down in these tables will coincide exactly with the ideas of everybody engaged in screw machine operations. Conditions as to materials, lubricants, clearances of cutting edges, quality of tools, etc., all have an important bearing upon the question of efficient cutting feeds and speeds. It is believed, however, that the foregoing information should be of service to a good many readers and thinkers, representing as it does the practice commonly followed by one of the largest brass shops which uses carbon-steel screw machine tools.

From the Consular Reports we learn that American wire manufacturers might find the Australian Commonwealth a profitable field for the exportation of wire netting. The farmers are looking toward wire netting as a protection against the rabbit pest. Last year about 1,500 miles of netting, selling at $122 to $146 per mile, was imported. Netting is imported free of duty.

MACHINE FOR SCOURING AND SCRATCH BRUSHING KNOBS AND OTHER METAL ARTICLES.

A machine patented June 30, 1908, by David F. Broderick, of New Britain, Conn., and by him assigned to Sargent & Company, of New Haven, Conn., consists broadly in a carrier adapted to convey the knobs or other articles successively to the scouring brushes, and means for rotating the knobs while they are being brushed. The machine can be used for removing grease or oil from the



SECTIONAL ELEVATION-MACHINE FOR SCOURING KNOBS.

knobs, or for grinding, buffing and burnishing them. For removing grease or oil, scouring brushes like those shown in the drawings are used, and soap, water and pumice stone or other scouring agent is fed onto and against the rapidly revolving brushes. When it is desired to buff or polish the articles, cotton wheels are substituted for the bristle brushes shown; and for burnishing, as after plating, steel or brass wire brushes are employed.

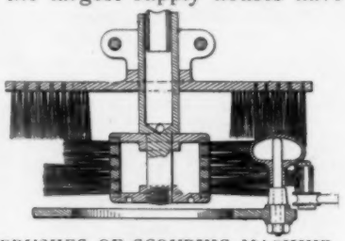
In all these operations the knobs are placed on the pins in advance of the brushes and are removed by an attendant located in the rear of the brushes. As the knobs approach the brushes they engage a friction shoe which causes them to be rotated as they are moved under the brushes. As the forward movement of the kno bis comparatively slow, and as the brushes make anywhere from 600 to 1,200 revolutions a minute, it will be seen that the knobs will be rotated several times during their contact with the brushes, thus bringing all parts of their surface under the brushes.

During the last half of last year the Calumet and Hecla mines produced 83,863,000 pounds of copper. The high-water mark was in 1906 when the output was 100,023,000 pounds.

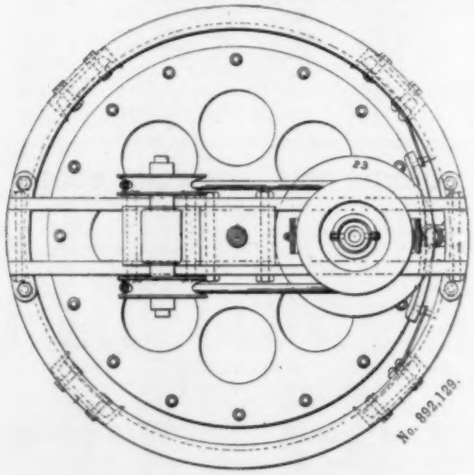
CLEANING NICKEL ANODES.

By B. W. Gilchrist.

Fully one-half of the nickel platers of to-day still cling to the idea that to produce the best results in plating nickel the anodes should be thoroughly cleaned and scraped frequently to allow the free passage of nickel through the solution, and are prepared to support their claims with quotations from unquestioned authorities in the art, and the largest supply houses have always ad-



BRUSHES OF SCOURING MACHINE.



PLAN OF SCOURING MACHINE.

vocated this procedure. But there are to-day many who, believing that "the proof of the pudding is in the eating," have by practical tests become converts to the opposite view and believe that when the anode surface becomes coated better deposits are obtained than is possible from new or scoured anodes.

Having become a believer in allowing the anode to remain unscrubbed, I have made numerous tests to substantiate this view and am convinced that the soft black powder which accumulates on a nickel anode is of the greatest value to the success of the operation.

Where the plating barrel is used it is almost an impossibility to secure satisfactory results until the anodes have acquired what might be called a plating surface and I have invariably found that the nickel is deposited with more rapidity and is of a better quality and color.

Scrubing an anode takes from it the loose nickel which was most easily acted upon by the current—cuts off the sharp edges and reduces the active anode surface, causing the solution to become impoverished and necessitating the addition of salts. Again, the presence of carbon, which is contained on the surface of the unscrubbed anode, forms a local action—the nickel, carbon and oil of vitrol forming a battery which is continually attacking the anode surface, and thus replacing to a great extent the nickel which is being deposited.

Any plater can prove the assertion that a more satisfactory result can be obtained from an unscrubbed anode by placing new ones in a tank, plating with them for say ten minutes and then putting in old unscrubbed anodes.

RUINOUS BIDDING BY GUESSING IN THE ART METAL LINE —A REMEDY.

By John G. Niederer.

Estimates given on new work in most lines of contracting and manufacturing embody greater or lesser degrees of uncertainty as regards actual cost of production. There is usually some fractional part of the whole that it has been found cannot be figured with that knowledge that is desirable in order that the figures given will not only cover cost, but also will leave a margin for profit, a fact due probably to some condition in the work that has not yet developed in such shape as to determine its true character. This may arise from circumstances over which the bidder has no control. As a rule this forms but a small part of the whole, as far as the figures are concerned, but nevertheless it is a fact that is looked upon as deplorable. This little guess in a bid, which in every other respect can be figured with greatest care and intelligence, because of the knowledge gained in other work and the intimate acquaintance with all the operations, is a feature to be regretted.

But how would this estimator or bidder feel if he figured as do most of the art metal workers, particularly chandelier makers and architectural bronze workers? In most of these concerns the bidder is not a practical man; he does not even condescend to consult a practical man; now and then possibly it occurs to him to come into the shop and inquire what will this piece cost, etc. As a rule the foreman or superintendent makes a guess; then he may take the weight; then he goes out with this information and puts in a bid involving thousands of dollars—in other words his whole bid is an aggregation of guesses. Even if based upon cost records he must take doubtful records, giving time on a whole contract that was perhaps similar in design, but that gives him absolutely no detail. This lamentable state of affairs, this method of estimating by guessing, is admitted by some of the best known and largest manufacturers in this line.

Were you to enter one of these factories and inquire for data upon which figures are based, you would probably be told that they expected their estimator to figure as his intelligence dictated; or they might show you a record cost ticket giving cost of work on a whole contract of some former order, but in very few shops would you find a cost record in details, showing, for instance, cost of arms, backs, capitals, bases, columns, etc.—records gathered in such a way there can be no doubt of their accuracy.

Why this great element of guess work no one seems able to explain, further than that every new design depicts new shapes. While it might be a good plan to collect data covering specially collected records of the pieces, and that would prove of help to the estimator, it has never been done because—well, because guess work seems less expensive.

But let us look into this matter. It is admitted that the special collecting of cost records would mean the engaging of a man of intelligence and wide experience in this particular line; one who would be quick to note the possibilities, and be capable of discerning efforts to mislead; one who would possess enough tact to press his efforts of research in a way that would not antagonize but rather tend to further co-operation in his purpose by the heads of the working departments and the working force; and admitting, for the sake of being liberal, that his work would not be of great value until his records had covered at least one year, and that his salary, in view of his important work, could not be of small proportion, is it not evident that a really reliable record of what these arms, capitals, and columns have cost, would save in the following year again and again the sum of the first year's expense of gathering and introducing such cost system.

The ruinous competition which is so glaringly evident in the art metal line when business is somewhat stagnant is due to the fact that the lack of fairly accurate data makes the competing bidder cross the line of safe, lowest figures, because he does not see the danger line—it is not marked out for him—and the longer the dull business prevails the greater will be the losses from too low bids based upon guesses and an effort to keep the organization together.

It is time for all manufacturers of art metal goods, particularly makers of special designs, to take heed, and get together as do the manufacturers in other lines. The writer might mention the National Machine Tool Builders' Association, whose uniform cost system committee presented its report at the recent convention. The reason for maintaining this committee is stated in this quotation: "The whole idea of the present report, which represents a simple method or system, began with the fact that machine tool manufacturers making similar and competitive machine tools discovered among themselves ruinous and unprofitable competition based presumably on actual costs. Comparisons soon showed, however, that even where there were fair cost system methods, important and appreciable large elements were treated by different manufacturers in different ways. It became apparent that for the good of all it was desirable that machine tool builders should have a uniform cost system in which various elements of costs should be handled alike for all."

Art metal work of special design is not machine work; yet there is no reason why estimating should not be based upon intelligence instead of guess work. Any one who has noticed the very great difference in figures bid on work, can see that pure guessing is still the factor with most.

This somewhat slow period is the time to introduce new efforts to attack and solve the problem. Investigation of the affairs of a number of concerns would show many who have had none too easy a time during the prosperous days just passed and who, now that the dull times are on, ought to make up their minds to take hold of the causes of their weakness, get together and have an analysis made. The reward will be purification and possibly a great reward when uniformity has been reached. To quote another passage:

"The wise manufacturer should desire not to show his costs as low as possible, but to show them at a high enough figure to make him perfectly safe in all contingencies, in using this cost as a basis for selling price and only reduce his cost by actual economy."

A new aluminum alloy, having several admirable qualities, has been patented (May 5, 1908) by Walter Gosmann, and by him assigned to Fried. Krupp Aktiengesselschaft, of Essen-on-the-Ruhr, Germany. The alloy consists of about 87% of aluminum, 8% of copper and 5% of tin. The content of copper in the alloy may vary between 7 and 8.5% and the content of tin may vary between 4.5 and 5.5%. It can be easily cast and it is claimed the castings are completely homogeneous, and have relatively high rigidity; they can be easily worked and the finished articles have a beautiful, lustrous appearance.

NEW WORKS AMERICAN MANGANESE BRONZE COMPANY.

The American Manganese Bronze Company, 99 John street, New York, U. T. Hungerford, president, W. A. Locke, secretary and treasurer, announce the completion of their works at Holmesburg Junction, Philadelphia, on the New York division of the Pennsylvania Railroad. The buildings are of re-inforced concrete and steel framework construction, with brick curtain walls, and consist of melting plant and foundry, metal storehouse, core shop and office, with complete chemical and testing laboratories, light and power plant, and machine shop.

The main building is equipped with a ten ton Niles electric traveling crane, which together with a one ton electric hoist serves the entire plant. Special attention has been given to light and ventilation. The plant is equipped with pneumatic tools for the cleaning of castings and its 600 feet of siding running the entire length of the plant insures economical handling of raw material and shipments. Nothing has been omitted in the construction of this plant that would tend to make it thoroughly modern and up to date in every particular.

The products of the American Manganese Bronze Company comprise ingots, billets, forgings, rods and sheets, together with both large and small castings, their facilities permitting them to supply bronze castings up to 20,000 pounds each and in this particular they occupy the unique position of being able to produce the largest bronze castings in this country. In addition to their special Spare's Manganese Bronze, Spare's White Bronze and Spare's Hydraulic Bronze alloys, they also produce standard U. S. Government compositions and other high grade alloys designed to meet the most severe engineering requirements.

TO APPEAL COLD GALVANIZING DECISION.

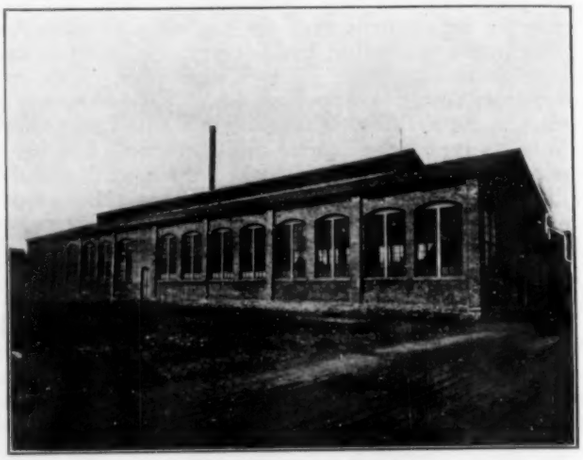
Further developments may be expected in the matter of cold galvanizing patents, according to the United States Electro-Galvanizing Company, of Brooklyn, N. Y., which announced in the July number of THE METAL INDUSTRY its intention of appealing from the recent decision of the United States Circuit Court, in favor of the Hanson & Van Winkle Company, of Newark, N. J., to the Circuit Court of Appeals.

The original patent on the process in question was issued in 1896. Since that time the process has been adopted extensively by manufacturing concerns and others here and in foreign countries, has met with marked success at several of the Government navy yards, and is now generally considered superior for many purposes to the old hot process. The United States Electro-Galvanizing Company has licensed various concerns to use the process and has also made a specialty of equipping plants complete with its patented labor-saving handling devices. To these devices the company attributes much of the success of its business in reducing costs and obtaining uniform results. The company itself operates two large plants in Brooklyn, N. Y., one a jobbing and demonstrating plant which has a capacity of twenty tons a day, and which is kept busy on jobbing orders from all over the country, and the other a pipe and bar iron galvanizing plant which is equipped for handling such material in long lengths and large quantities.

The boiling point of zinc, as established by Violle in 1882, at 930 C., has been accepted very generally until quite recently. Researches carried on lately show that with proper apparatus and with the exercise of great care to prevent the formation of oxide, the correct boiling temperature is very close to the neighborhood of 921 degrees C.

THE LACKAWANNA FOUNDRIES.

The Lackawanna Foundries is a corporation organized under the laws of New Jersey, with works at Dover, N. J., and executive offices at 74 Broadway, New York City. The plant at Dover is practically new, built of brick, with overhead steel construction and corrugated iron roof, the main building being 160 by 40 feet with an 18-foot lean-to extending the entire length. Ample shipping facilities are provided by two railroads, the Dela-



LACKAWANNA FOUNDRY.

ware, Lackawanna & Western and the Central Railroad of New Jersey, a sliding from the latter running into the company's property. The building is thoroughly well lighted by large windows in both the side walls, and is wired throughout for electricity.

Adjoining the main building on Salem street is an office building, 15 by 27 feet, and at the opposite end is the

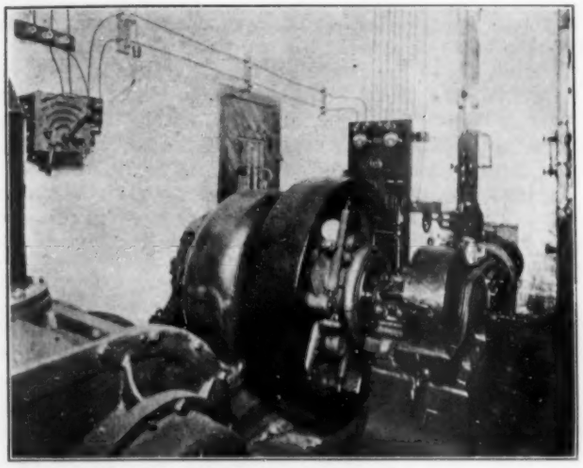
INTERIOR OF FOUNDRY.

storage and shipping room 25 by 30 feet, alongside the railroad tracks.

The power plant consists of an 85 horsepower Harrisburg engine supplied by a boiler of 100 horsepower. Direct connected with the engine is a 50 kilowatt generator which supplies current for all the power machinery, motors being located wherever required.

The Whiting cupola has a capacity of 10 tons per hour, the charging platform being served by a hydraulic elevator of a capacity of 1 ton. The Green positive pressure blower, furnished by the J. W. Paxson Company, is run by a 15 horsepower motor.

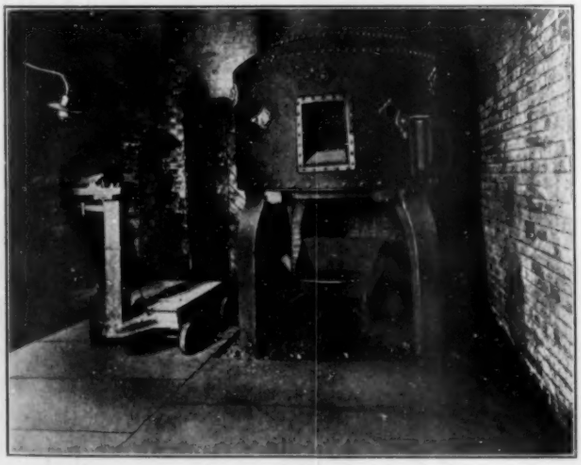
It is the intention to immediately install a 5-ton electric crane to travel the entire length of the building, so as to serve the whole molding floor. While it is not the aim of the company to undertake any very heavy casting it has been deemed advisable to provide an equipment capable of handling large castings, if at any time it became necessary to do so.



ENGINE AND DYNAMO ROOM.

There remain to be added to the plant in the very near future one coke melting furnace and three or four oil melting furnaces intended for the making of brass, bronze and aluminum castings. There will also be put in drill presses, lathe and other machine tools in order that casting may be finished when required.

While the company will make small gray iron castings in quantity, one of the principal branches of the business will be the making of what may be termed commercial articles in bronze, brass and aluminum, especially the first mentioned. These will include candelabra, sconces, table



CUPOLA.

ornaments, lamps, trimmings, etc. The management believes that there is a wide market for really artistic articles of this character, made in quantity and therefore sold at a reasonable price. Bronze ornaments are and always have been an expensive luxury, but this plan, as now proposed, will place art metal work at the command of those who would buy it if they could. In carrying out this idea the first consideration will be the artistic, and then the possibility of reproduction at a reasonable rate. In this way it is expected to cater to that large class who have real feeling for the beautiful, and who, under present prevailing conditions cannot afford it.

The company will also make castings and sell ingot metal, of a special molybdenum bronze having great strength, the formula for which was originated by the chemist and metallurgist of the company, Prof. Ora W. Knight, chemist for the State of Maine.

The officers of the company are: George Pierson, president; Henry E. Dixey, first vice-president; Leslie C. Hillard, second vice-president; John Henry Hurlbutt, treasurer; John Duncan Brooks, secretary, and James W. Kent, general manager.

THE STATE OF THE COPPER MARKET IN ENGLAND.

(From Our Birmingham Correspondent.)

Some interesting remarks on the copper industry were made by Charles C. Turnbull, Chairman of Allen Everitt & Sons, Ltd., one of the largest firms of brassfounders in Birmingham. Mr. Turnbull remarked that their inability to pay a dividend on ordinary stock was the result of great irregularity of trade, which during the past year had shown extraordinary variations. Even those in the Midlands not connected with the copper trade must have found that the alterations in the prices of metals—the fall of 50 per cent. all round after a very rapid rise—had made business very difficult. Next year he hoped they would be restored to the happy conditions of the past eighteen years, when their earnings had been not altogether unsatisfactory, and that they would be able to declare the dividend to which the shareholders were accustomed.

Continuing, Mr. Turnbull said there was no doubt that the copper trade was in a very interesting condition. Last year was, as shown by reliable figures, the first in which rather more copper had been produced than consumed. In the four preceding years the consumption had exceeded the production. Some of the best authorities on the subject said that each year from 15 per cent. to 20 per cent. of old copper was again available on the market. The very high price of copper last year had the effect or reducing materially the quantity of old copper throughout the world, and this might have a considerable bearing on the future of the market. In America the conditions of the copper trade had very much altered; the cost of fuel, wages, and railway transit had risen very materially.

It was difficult, the speaker added, to say whether in future anything under 13 cents per lb. was going to satisfy the big American combinations. These controlled 60 per cent. of the total copper produce of the world. Next to America came Spain, with 7¼ per cent. Under such conditions they must not be certain they were going to get their refined copper indefinitely at £60 per ton. In the interests of the trade it was to be hoped that the price would remain moderate, and that they would not be troubled by the large American combinations, which were usually purely speculative and often led to disastrous results.

The House of Commons, England, is now considering a bill having the following provision: "If a dealer in old metal * * * purchases from any person apparently under the age of 16 years any old metal, he shall be liable to a fine not exceeding 5 pounds. For the purpose of this section, 'cold metal' includes scrap metal, broken metal, or partly manufactured metal goods, and old or defaced metal goods."

INDUSTRIAL

NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

NEW TILTING CRUCIBLE FURNACE.

The Rockwell Furnace Company, of 26 Cortlandt street, New York City, have placed on the market a new tilting crucible furnace embodying many advantageous features

MELTING POSITION.

which will be readily appreciated by foundrymen. As can be seen from the illustrations, the crucible is not removed while pouring the metal from the furnace, but remains fixed, the metal being transferred to the molds by means of a heated ladle or crucible, as preferred.

POURING. A LADLE OR CRUCIBLE MAY BE USED.

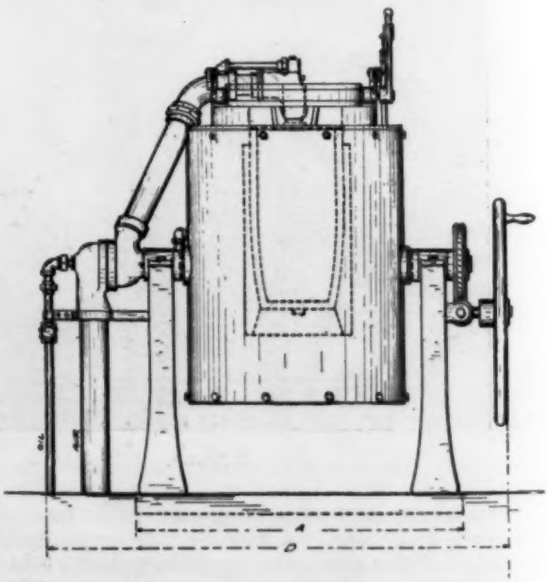
The burner, which is operated with a fan blast of but 12 ounces, makes but little noise and uses either oil or gas fuel. It is located at the top of the heating chamber and the flame is projected down against the bottom of the chamber and not against the crucible, which insures the maximum life of the crucible. In case of the breaking of the crucible the metal is all retained in the furnace and does not run on the floor, and the melting may be continued until the metal has reached the proper temperature, when it may be transferred to the molds in the usual way. This feature makes it unnecessary for the foundryman to worry when the crucible becomes thin, or to throw it away before it actually breaks, as is often done, when several heats may be gotten from it.

As any air pressure from 12 ounces to 2 pounds may be used, the furnace can be operated from any available air and oil system which may be supplying other furnaces, a separate plant for this purpose being unnecessary.

The cover is manipulated by a lever conveniently located at the rear of the furnace, from which a pin engages a ratchet and holds the door rigidly in any required position and permits covering the crucible after pouring, without returning the furnace to an upright position.

Heavy pieces of metal may be fed to the crucible through the opening in the cover of the furnace while the blast is on; the waste heat passing through melts it down into the crucible very rapidly. As the crucible is not removed, after the first heat metal is always charged into a hot pot, which greatly facilitates the melting.

Where it is essential that the heated gases in the furnace should not come in contact with the metal, a cover may be put on the crucible to protect same. Although it is unnecessary for ordinary work, as scrap yellow brass stampings from the ends of safety pins have been melted hot enough for pouring very light castings with a loss of



FRONT ELEVATION.

but 3%. The only precaution being taken while melting was to cover the metal with a few pieces of hard coal.

The number of heats per day will vary from 3 to 10,

and the amount of fuel required will range from 1½ to 3 gallons of oil—210 to 420 cubic feet natural gas—315 to 630 cubic feet illuminating gas—675 to 1,350 cubic feet 300 B.T.U. water gas, according to the quantity and quality of metal melted, the heat at which the metal is required, and the attention and promptness with which it is melted and poured. But the above is stated to be a fair average.

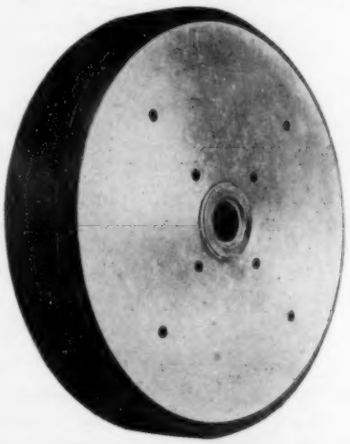
The furnace is easily relined with simple and inexpensive fire tile.

The furnaces are at present made in four sizes to hold numbers 70, 125, 275 and 450 crucibles, respectively. A 32-page catalogue describing this and twenty other styles of melting furnaces has just been issued and may be had by addressing the manufacturers.

THE EVER READY POLISHING WHEEL.

The polishing wheel, a view of which is here shown, is designed for general use on metal, wood and hard leather. It has a metal frame supporting an elastic cushion. The face of this cushion is provided with an emery cutting surface. Any grade of emery may be used from coarse down to crocus, for finishing.

A new cutting surface may be transferred to the wheel



EVER READY POLISHING WHEEL.

almost instantly without removing it from the lathe, thus eliminating all use of the glue pot or loose emery powder.

The wheel is indestructable from ordinary use and does not change its original diameter. While the wheel is intended for castings and heavy work, the elasticity of the cushion renders it impossible to gouge the metal, making it particularly valuable for soft and sheet metals requiring delicate handling.

These wheels are made of various sizes with flat and oval faces to accommodate a wide variety of work.

The wheel is the invention of, and is manufactured by, J. A. Parker, of Rochester, N. Y.

The exports of precious stones from Rio Janeiro, Brazil, to the United States during 1906 were $8,903, and in 1907 were $42,513. The shipments of precious stones indicate in a measure the development of the diamond mines of northern Minas, although the figures given are not to be taken as measuring the output of the district or any considerable portion of it. There are still considerable quantities of stones handled out of the purview of any customs or other figures.

SELF-OILING POLISHING AND BUFFING LATHE.

The self-oiling polishing and buffing lathe, here illustrated, is the result of years of experience in the manufacture and sale of buffing and polishing machines by the Chas. F. L'Hommedieu & Sons Company, of 99 South Clinton street, Chicago, Ill. The lathe is furnished with

SELF-OILING, BUFFING AND POLISHING LATHE.

crucible steel shafts, dust proof bearings and cast iron boxes 6 inches long. The makers call particular attention to one particular feature of this lathe, and that is the self-oiler. It is not oiled by a piece of felt or waste, but by a ring revolving on the shaft, which carries the oil with it as it turns. The advantages derived from this method of oiling will be appreciated. The lathe weighs 335 pounds; from the base to the center of the spindle is 39 inches; diameter of spindle in the boxes 1½ inches, and between flanges 1 or 1¼ inches the length of the spindle is 50 inches the pulley is 5 x 5 inches. The builders state that for general all around work this lathe cannot be excelled.

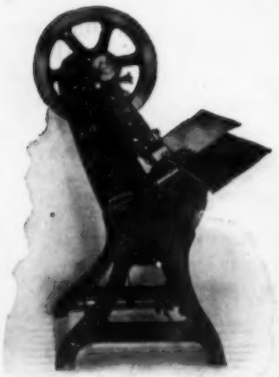
THE "IMP" GASOLINE TORCH.

This torch, manufactured by the Frank Mossberg Company, of Attleboro, Mass., is intended for heating and

THE "IMP" GASOLINE TORCH.

soldering. It is extremely simple in construction and operation and requires no air pump. The flame produced shows complete combustion, and the heat generated is intense. The torch is started by simply holding a match under the neck for about 30 seconds. It weighs but 3½ ounces and will burn 2 hours.

BLISS PRESS FITTED WITH PATENTED STAGGER FEED.



In the accompanying illustration is shown a Bliss press fitted with patented stagger feed device recently designed and built by the E. W. Bliss Co., 23 Adams street, Brooklyn, N. Y. The attachment can be made adjustable for different size blanks, and while especially adapted for round work, can be used to advantage on irregular shapes.

The simplicity of the attachment is one of its points of merit, overcoming the objections which are sometimes brought forward against automatic stagger feed gang presses. With the attachment no preparatory slitting of sheets is necessary. This will be seen from a description of the operation of the machine which is as follows:

The sheet from which the blanks are to be cut and formed is placed on the table and fed against the first finger which, together with the back gauge on table, registers the sheet for the first cut, after which the press is run continuously, tension being kept on the sheet to bring it against the first finger which acts in a manner similar to the regular automatic finger gauge. As the sheet progresses the scrap is sheared from the back by means of knives which cut a true and straight edge for gauging the back of the sheet on the second run, for the starting of which run the stagger finger is brought into play by depressing a lever underneath the table. The sheet is again placed against the back gauge and brought up to the stagger finger mentioned. After the first cut, the stagger finger is automatically disengaged and the first finger again comes into play. The sheet is run through until entirely cut up in the manner described, the stagger finger being used alternately to start every other row of blanks. By using this stagger method of cutting, a saving of 6% to 15% in the amount of stock is effected, this varying according to the size of the blank.

The following shows the saving effected. Take a sheet of tin 20" x 28" from which you wish to cut blanks requiring a 2¼" diameter cut edge. By the old method of slitting the sheet into strips and then running through the press, you would obtain 70 blanks from the sheet. By the stagger method used in the press shown, 76 blanks are obtained from the same size sheet. Another illustration is shown in the manufacture of bottle caps, for which 1½" cut edge is necessary. By the old method, from a sheet 20" x 28", 234 blanks are produced; by the method used in the press shown, 270 blanks are obtained from the same size sheet.

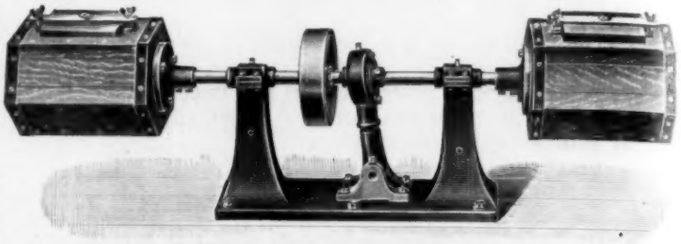
The gauges are made for continuous and rapid operation, materially increasing the output and are very accurate, successfully handling decorated stock. Another feature is, that the scrap is kept entirely separate from the blanks, and is cut into small pieces which greatly facilitates its handling.

The Bliss Company state that they will be pleased to figure out the exact saving which may be effected by the use of this machine on receipt of information regarding the diameter of cut, size of sheet in use, and number of punchings actually obtained from each sheet.

It has been decided to revise the coinage system of Manchuria, China, with the silver dollar as the standard.

THE EDMONDS' POLISHING AND BURNISHING MACHINE.

The patented polishing and burnishing machines designed and built by H. Edmonds, Soho Hill Works, Birmingham, England, are formed with the body in one casting, thereby permitting accurate machining of the wearing parts, and insuring to the purchaser facility in erecting and the minimum cost in consumption of driving power.



EDMONDS POLISHING AND BURNISHING MACHINE.

By an original and simple mechanism a combined rotary and reciprocating motion is transmitted by a single belt to the machine. The articles to be polished or burnished are thus thrown in every conceivable direction, the cross action of the machine rendering it impossible for the work to get into a train or groove, and insuring the exposure of all surfaces of the articles contained in the barrels to the scouring or burnishing process desired.

The main dimensions of the machine illustrated are as follows: Length, with one barrel attached, 4½ feet; with 2 barrels attached, 5½ feet; weight of the machine, 125 pounds; weight of each barrel, 25 pounds; size of driving pulley, 10 by 3 inches. The barrels usually supplied with the machine shown measure 12 by 8 inches inside. This machine, known as No. 2, is intended for light trades. The No. 1 machine is much larger and is for brass founders, etc.

THE TRIPLEX BUFF.

The Triplex buff, of which the Zucker & Levett & Loeb Company, of New York City, are sole manufacturers under license, is made of any of their standard grades of muslins and can be furnished stitched or not as desired. The whole secret of the great wearing qualities of the Triplex being in the fold, the prime object of same being to produce a cross-cutting or diagonal surface on the cutting face of the buff, the buff being made of a succession of folds so formed as to offer a greater surface to the work and at the same time to save composition. The mesh of the fabric crossing as described prevents the material pulling out or fraying on the working edge.

The Triplex buff uses up every strand of thread in the wheel, giving practically 100% efficiency of wear. When the wheel is worn down to say 6 inches, the stubs may be returned to the makers, and at a nominal cost, remade into a wheel of approximately double the diameter of the worn down wheel, using two wheels so returned to make one new wheel. In this way the user has one and one-half buffs at the price of one.

For example: 100 sections of 14-inch "BXX" muslin Triplex buffs, 18-ply, at to-day's market, say 30 cents per section, $30, when worn down to 8 inches, remade to 14 inches diameter, two sections used to make one, 50 sections at 11¼ cents, $5.62; total cost of 150 sections, $35.62; cost of one section approximately $0.23¾.

The price is only 10 to 12 per cent higher than the price of an ordinary old style buff of same size and ply and made of the same grade of muslin. The remade buff being fully equal to the original buff as it contains double the number of folds, as compared to the new wheel.

CINDER OR ORE CRUSHER.

The cinder or ore crusher here illustrated, built by the Detroit Foundry Supply Company, of Detroit, Mich., can be used dry or with water, the latter being preferable when the metal is to be sold, as the washing brings out the metal clean and bright. While the capacity of the machine when run dry is much greater, the metal comes out dark colored. It is necessary to install an exhaust fan equal to the opening, which is 10 inches, to draw away the dust as it is crushed in the machine. In the wet process it is only necessary to insert a 1-inch water pipe at the small end with a suitable valve to control the flow of water into the machine. Under the large end of the machine is a trough to carry away the water as it flows over.

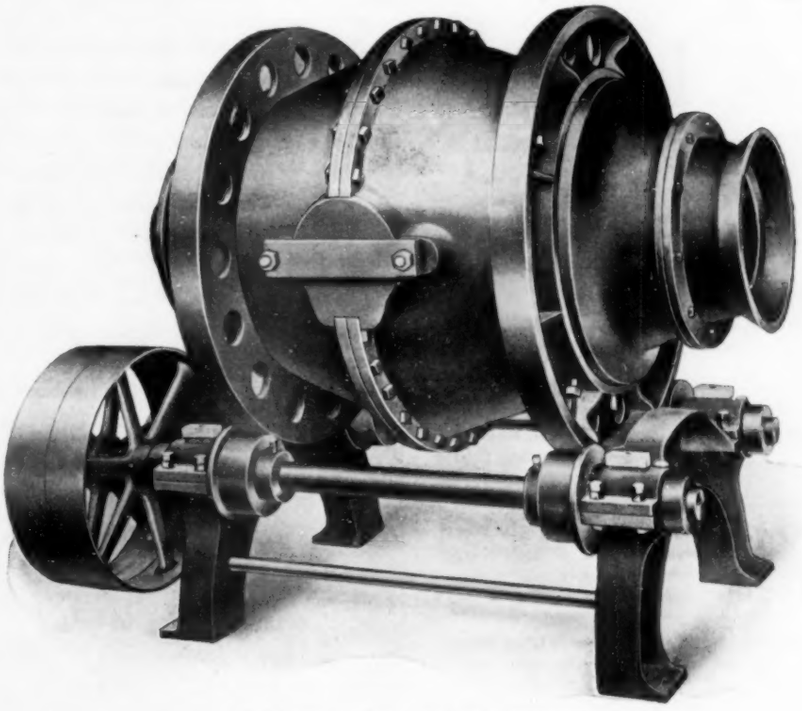
The crushed metal remains in the bottom of the case and is discharged through a small opening in the side of the case at the will of the operator.

The crushing is accomplished with the use of a heavy roller weight, tapered at both ends, the same shape as the barrel of the machine. This weight or roller is made with angular grooves or pockets, which carry the material to be crushed and ground over, and drop it under to be pulverized over and over again.

The machine is fed through the large end, in either the wet or dry process, by means of an ordinary shovel, this being done in either case while the machine is in motion. The amount is regulated by the attendant and depends upon the nature of the material to be crushed. The machine will grind and extract from 12 to 20 barrels of brass foundry skimmings and ashes per day of 10 hours.

The general dimensions of the machine are as follows: Floor space, 66 inches by 43 inches; the barrel is 50 inches long; the greatest diameter is 39 inches and is 2 inches thick. The roller or weight inside is 2 feet long and 18 inches greatest diameter. Weight of roller 550 pounds. The pulleys are 22 inches diameter and 4 inches face.

This style of machine has been in operation in some of the large brass industries for a number of years, but was originally driven by heavy gearing and required from 6 to 8 horsepower. With the new roller drive system a great saving has been effected in the power required for driving, amounting to a saving of the total price of the machine in about 2 years.



DETROIT CINDER OR ORE CRUSHER.

TIN OUTPUT FROM FEDERATED MALAY STATES.

Vice-Consul-General George E. Chamberlin, of Singapore, states that the following table shows the output of tin from the four states of the Federated Malay States during the first three months of 1908, in comparison with the same period in 1907:

	1908.	1907.
	Tons.	*Tons.*
Perak	7,183	5,875
Selangor	4,523	3,836
Negri Sembilan	1,019	1,045
Pahang	502	460
Total	13,227	11,216

PRODUCTION OF TIN IN UNITED STATES.

From an advance chapter from Mineral Resources of the United States we learn that in 1907, as in former years, the output of tin in the United States was insignificant when compared with the world's output, forming only about one-twentieth of 1 per cent. of the world's total production for the year. Eighty-nine tons of concentrates, valued at $33,285 and containing about 62 tons of metallic tin, were reported as produced. In addition several hundred pounds of metallic tin were produced in an experimental way by the Gertie Mining Company in South Dakota. A considerable quantity of tin ore, mostly of low grade, which is not included in the production, was reported as mined and left on the dumps.

EDITORIAL

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CONTENTS

TO IMPROVE BRASS MELTING FURNACES.

In the account of the Toronto Convention of the American Brass Founders' Association in our June issue, mention was made of the remarks by F. A. Coleman on the efficiency of brass melting furnaces. The speaker dwelt upon the heat losses now taking place in furnaces for this purpose and the strong, almost imperative, need of accurate investigation of these losses in the endeavor to find a remedy. The task is a formidable one, but at the same time one that would amply reward the successful investigator.

It is well known that the heat losses are tremendous; that only an exceedingly small percentage of the heat of the fuel finds its way into the metal being melted. To find out where this heat goes to, and to re-design so as to catch more of it in useful work, are the principal factors in the problem. All that is known of the subject now is that a certain quantity of coal, or gas, or oil, is required to melt a pound of metal. There is only a crude conception of the direction in which the rest of the heat disappears; it is known that a great part is busy maintaining the heat of the walls of the chamber and that a great part passes out through the flues. Beyond this the action within the furnace is more or less a mystery.

How to best approach the problem is of the utmost importance. Naturally, in an investigation of this character, it is to be supposed that the first task would be to find out exactly what takes place within the furnace and the temperatures of all the parts. But, still more vital, what is to be done with this data when once obtained? How can the construction be so improved that the heat will go where we most desire it, and not travel along paths selected by itself? If we knew precisely what takes place within the walls it is very doubtful if we would be much nearer the solution. Compared with the bulk, or cubic contents, of the chamber and its walls, the bulk of the metal is quite small, and yet these have to be kept at a temperature equal or nearly equal to that of the molten metal itself. In other words, the walls and space they enclose have to be kept at the melting temperature.

The question is not nearly so simple as the cupola and blast furnace for handling iron, since, for chemical reasons, the fuel cannot be intimately mixed with the metal. This means that distance must separate the two, fuel and metal, and in this perhaps rests the main difficulty.

It is not likely that much, if any, improvement will be made in the materials of which the furnaces are at present built. If this is true, then advance must be looked for in the design alone. The materials have not changed much in recent years and yet the furnaces of to-day are

vastly more efficient and economical than formerly and improvements are being continually made.

While heat acts in a cumulative manner, it must move in order to reach intensity; a pocket through which there is no flow cannot be heated as efficiently as one through which there is a continual movement. In the same way the rapidity of a flow through a passage has much to do with the degree or intensity of the heat imparted. Easy curves and absence of angles is a rule that is well understood and appreciated. These aspects will be taken into careful consideration in the study of the problem.

It is much to be hoped that Mr. Coleman will be successful in his researches and that he will be assisted as far as possible by those interested in either the use or the construction of melting furnaces. An investigation of this kind cannot but result in great benefit, whether brass melting furnaces are radically improved or not.

GETTING RETURNS FROM TRADE PAPERS.

The progressive manufacturer and business man takes all the papers published in his line and examines them carefully as a part of his work—as a duty he owes himself and his business. He does this because, in his experience, he has found that the information he has by this means obtained has paid him many times over for the time spent in the examination. Following this course he keeps abreast and a little ahead of developments, and derives quick benefit from both the manufacturing and business hints found in his papers.

His competitor has no confidence in trade papers, never pays for one, and would not take the time to look one over if it were presented to him. He is too busy and his time is too valuable to be occupied with reading papers—he knows his business all through the alphabet, forward and back, and a whole college of editors could not tell him anything worth while. He has learned everything and all he has to do is apply that knowledge. Unfortunately this breed is exceedingly numerous just now; but its evil results are lessening slowly and steadily.

Of these two cases the first is on the road to further prosperity and is aware of the fact; the second will never increase his present output to any remarkable degree and is not aware of the fact. Single concerns have become too large and the time has gone by when one man, unaided, can build up and care for big interests. The first makes others assist him, whether they are on his payroll or not; the second knows so much he is ignorant.

There is an easy and efficient way of getting all the information to be had out of a trade paper and placing that information so that it will do the most good. We know of one works in New England where the method about to be mentioned has been tried for a long time and has given the most excellent results. This plant is large, employing a general manager and several superintendents and foremen.

As soon as a trade paper appears it is handed to one of the stenographers who is familiar with all branches of the business and who is also acquainted with the commercial end. He first pastes on the front cover of the paper a printed slip carrying the names of the heads of the departments all through the works from the president down. At the bottom of the slip is the injunction not to keep the paper, but to pass it on down the line.

The clerk examines the paper thoroughly and marks on the slip, opposite the several names, the pages on which articles of possible value may be found. The paper then goes to the president, if his name is marked, and he examines the articles referred to, checks his name to show he has seen it and passes the paper to the manager who follows the same course, and so on through the establishment. In this way each man's time is occupied only with matter that directly concerns him, and he is saved the trouble of searching through a mass of papers for stuff that may be of interest to him.

The two important considerations in this scheme are that it saves the time of busy men, and gives them the immediate information that is oftentimes of great value. The aim is to have all printed sources of information come into the office and then to make quick use of it. The consequence is that the heads of that plant are up to date upon any and all questions concerning their work.

It may be mentioned that the plant referred to has more than doubled its capacity in the past five years. Undoubtedly the business-like way of using trade papers has contributed its share of this prosperity. Even as a man handles his trade papers so you may judge of his business capabilities.

BRITISH NOTES.

(From our Birmingham Correspondent.)

The Birmingham Assay Masters recently published their Annual Table showing for the year ended June 30th the weight and number of articles assayed with comparisons for the past 20 years. The following is an extract showing the increases and decreases over various periods:

	1888.	1898.	1906.	1907.	1908.
Gold wares assayed and marked — ounces..	122,743	333,741	349,308	371,036	381,957
Gold wares assayed and broken — ounces ..	1,024	1,772	2,735	2,766	1,918
Silver wares assayed and marked — ounces ..	775,901	2,539,019	3,838,482	3,720,804	3,588,640
Silver wares assayed and broken — ounces ..	1,438	616	1,565	2,130	2,974
Number of gold and silver wares entered for assaying ...	3,347,974	11,889,093	12,894,981	12,693,726	13,355,074
Number of assays made	109,760	286,750	423,975	460,316	478,330

ELECTRICAL CLEANING BATHS.

To the Editor of THE METAL INDUSTRY:

Mr. Proctor, in his paper on "Electrical Cleaning Baths," read at the recent convention of The American Brass Founders' Association, and published in THE METAL INDUSTRY, has advanced a new theory to account for the action of the process, or at least omitted to mention the part played by the metallic elements, sodium, potassium, etc., which is very largely believed to be as important as the action of hydrogen, and, in fact, necessary before the latter can be of any practical effect.

As Mr. Proctor claims to have written the first article that ever appeared on the subject of elctro-chemical cleaning, in 1905, it is possible that he was not fully advised of earlier work in this direction, and for the purpose of throwing "more light" on this subject I will review such previously published matter that came to my attention as I can recall.

About 1897-1899 there appeared in one of the current technical journals a very complete and comprehensive account of the experiments and practical work done with this method at the University of Wisconsin; this article was largely quoted and mentioned in digests of other journals at the time, and I regret that I have not a copy at hand to give credit to the proper parties.

To the best of my recollection the theories advanced and demonstrated as correct, were that the caustic metallic elements, such as sodium and potassium, saponify or reduce such matter as may be on the surface of the metals under treatment, and which are susceptible to the action of these caustics; the action of the hydrogen is claimed to be purely mechanical, in hammering the solidified matter loose from the work and floating it to the surface of the solution.

If hydrogen alone is the cleansing agent, as one is lead to infer from Mr. Proctor's article, it would seem that water would be sufficient as an electrolytic solution, but experiments have demonstrated that it will not clean work even with strong evolution of hydrogen.

In the Wisconsin experiments, if my memory serves me right, neutral or saline solutions rather than alkaline were used and advocated; a solution of common salt (Ne Ck) and water proved a very effective one for the purpose, and would be ideal were it not for the disagreeable and injurious chlorine fumes generated. This would seem to dispute the theory that hydrogen is the cleaning element, and substantiate the claim that sodium, which is deposited by the action of the electric current at the cathode pole, is the element responsible, as no hydrogen is introduced except that of the water.

It is probably a typographical error in quoting Mr. Proctor as saying that "with a strong current a copious evolution of 'oxyhydrogen' gas is developed upon the articles," as this gaseous mixture does not take place, except outside of the solution, as mentioned by C. F. Burgess in his article on the subject, published in *The Electrical World* of Oct. 29, 1898. Mr. Burgess mentions that explosions sometimes occur on the surface of the solution, as these two gases mingle and ignite.

Mr. Burgess' article mentions the work of the Wisconsin University, and gives data showing the most economical current density; he also mentions the use of sodium sulphate as a suitable solution if carbon or other insoluble anodes are used. The writer made successful use of this method in installing an outfit for cleaning assembled bicycle wheels, for replating without removing wood rims or rubber tires, which would be injured in alkaline solutions. The method was also used for removing enamels from bicycle frames, accomplishing in from ½ hour to 2 hours what previously required several days' boiling in caustic alkali solutions.

There are many possible applications of this method which are not confined to the use of alkaline solutions, although there is at least one such patented for the purpose, and there seems to be considerable lack of understanding of the principles of this process, due, no doubt, to the fact that at the time of their introduction there was no METAL INDUSTRY to carry the information to the interested parties.

Mr. Proctor's paper, owing to its publicity, should stimulate interest and activity in the more general adoption of the method, and my criticism is entirely for the purpose of correcting the faulty principle advanced, or of having the theories mentioned here corrected for the benefit of those who have been led to believe them correct.

Yours very truly,
W. L. CHURCHILL.

Stamford, Conn., July 9, 1908.

CYANIDE COPPER AND BRASS SOLUTIONS.

To the Editor of THE METAL INDUSTRY:

Mr. C. S. Barbour, in an article in reference to red copper compound in brass and copper solutions (THE METAL INDUSTRY, page 208, July, 1908), states that cyanide will take its own weight of copper compound. I would say that I took 1 gallon of water, and it dissolved 1 pound c. p. cyanide; when dissolved I added I pound red copper and stirred many times. But when it was allowed to settle a cloudy sediment formed which showed it was not taken up. I presume others will try this to make a strong solution as a stock solution. I would like to know how Mr. Barbour dissolves the 1 pound of red copper in 1 pound cyanide (both high grade goods), and obtain a clear solution without any waste.

Of course, I could filter mine, but the sediment must be undissolved copper.

Subscriber.

Stamford, Conn., July 22, 1908.

The Board of General Appraisers has decided that articles consisting of decorated china vases attached to so-called rose trees of bronze, the latter being not only the component of chief value but the more significant feature, are not "decorated or ornamented" china vases within the meaning of paragraph 95, tariff act 1897, but are dutiable as manufactures of metal, not specially provided for, under paragraph 193.

CORRESPONDENCE

IN THIS DEPARTMENT WE WILL ANSWER QUESTIONS RELATING TO THE NON-FERROUS METALS AND ALLOYS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

METALLURGICAL.

Q.—Will you kindly publish a receipt for soldering platinum? It must be as near the color of platinum as possible and must not be brittle, as the seam has to be bent.

A.—Two pieces of platinum may be heated by holding them in the flame of the hydrogen blowpipe and hammering them together, when they will weld like wrought iron. Ordinary solders do not unite with platinum readily, but if a small quantity of gold is sweated into the surface of the platinum at nearly a white heat, they may then be used. Silver solder is the only solder that has the ductility you require.—J. L. J.

Q.—Will you kindly advise us how the following metals are made and give their analyses: Parsons' manganese bronze and white brass; common manganese bronze and tobin bronze? What is patented about Parsons' mixtures?

A.—The alloys in question have the following analyses:

	Copper.	Tin.	Zinc.	Lead.	Iron.	Manganese.	Aluminum.
1.	1.95	64.58	33.43	.02	.02	nil	nil
2.	57.72	1.14	39.84	.13	1.04	nil	.16
3.	57.55	1.49	40.02	.56	.38	nil	nil
4.	61.08	.05	35.37	.37	.67	2.46	nil

1. Parsons' white brass; 2. Parsons' manganese bronze; 3. Tobin bronze; 4. Common manganese bronze. Parsons' mixtures are not patented. It is best to buy these alloys in the ingot form, but you can make them from the above analyses by using high-grade copper and zinc, and manganese copper or manganese zinc.

J. L. J.

Q.—Will you kindly advise me of what material telephone receivers and transmitters are made.

A.—Telephone receivers and transmitters are made of soft iron. Possibly you refer, however, to the German silver trimmings used on some telephones.

J. L. J.

Q.—Would a scalp-proof crucible free from such annoyances as alligator cracks and pin holes, be of any commercial value? The same can be stored in water a week and then instantly plunged in a white heat without the least fear of their scalping or blowing. This relates to blacklead or graphite, sand and clay crucibles of all sizes.

A.—A crucible such as you describe would be ideal provided it contained nothing that would injure the metal smelted therein. If you have the goods and this is not a hot air proposition we would advise you to get in touch immediately with the leading crucible makers, whose addresses can be found in our advertising columns.—J. L. J.

Q.—In one of your replies you mention "plastic bronze." We are not familiar with this term and would be pleased to have you advise us the meaning, also giving the formula for the same.

A.—Plastic bronze consists of the following:

Copper	65
Tin	4½
Lead	29½
Nickel	1

It is rather difficult to mix properly. You can obtain the ingot metal from manufacturers. Some of the automobile manufacturers have had great success with Parson's White Brass on small high-speed bushings. Finished bushings, complete with oil growers, etc., can be obtained from makers.—J. L. J.

Q.—We want a metal for making patterns that will expand rather than shrink when cooling. The patterns only have to be used a few times and the metal need not be very strong.

A.—Replying to your question we would state that one of the largest manufacturing firms in the United States uses the following formula:

Tin	55
Zinc	44
Bismuth	1

This gives very satisfactory metal patterns and no allowance has to be made on them for shrinkage.—J. L. J.

MECHANICAL

Q.—What is the best working angle for a jab-tool in the monitor lathe and screw machine?

A.—When the tool is set at the center line of work 7½° is the proper angle, as the cutting edge is better supported in that position and will last longer and do better and more work. Always remember to grind the tool parallel with bottom face.—E. W.

CHEMICAL

Q.—We would like to ask your advice regarding plating batteries. We have been copper plating upon some heavy iron work and are oftentimes called upon to do this plating ⅛ to ¼ inch thick. It takes quite a time to get this deposit, particularly when running at the rate of ten hours a day. A good deal of time would be saved were we to connect the tank to the batteries over night and disconnect and run by dynamo during the day. The tank we wish to use in this case holds 100 gallons.

A.—Any good standard storage battery could be used for your purpose. This could be charged during the day and connected to the tanks at night, so that the work would be continuous. This method is in successful operation by manufacturers of silver deposits upon glass. We would advise you to correspond with reliable makers of electro-plating supplies as to the batteries most used for this purpose.—C. P.

Q.—We send you a sample brass plated article which has a light yellow color. How can we plate it so as to get a deep yellow color similar to low brass?

A.—To produce a low brass color with your present solution it will be necessary for you to add from ½ to

¾ of an ounce of carbonate of copper in 2½ times its weight of cyanide to each gallon of solution. If this does not bring up the color desired add 1 ounce bisulphite of soda to each gallon and gradually increase the temperature of the solution until the color is satisfactory. The regulation of the current will also assist in producing the color; a little experimenting will be required.—C. P.

Q.—I am sending you a copper medal and would like you to give me a receipt for oxidizing it.

A.—See answer to correspondent in our January issue, page 28, giving formula for a black finish upon Britannia metal. This solution will give you a good color similar to the color upon the medal. Another method that produces a good black and a deep red tone to the copper consists in preparing a strong solution of caustic soda (18 to 20 degrees Baume) in boiling water; then add all the pulverized sulphur it will absorb. Allow to cool and then place in a good-sized bottle and keep for use. Add just so much of this solution to each gallon of cold water as will give you the desired results. Finally relieve and lacquer in the usual manner.—C. P.

Q.—We send you a polished brass compression angle stop. We would like to know what causes the metal to tarnish. Some of these castings will tarnish in two or three days, and at other times it is much longer; then again castings will not tarnish at all. We use the same mixture of metal at all times and the same polishing material. Oftentimes in the morning we find castings in the grinding room which have been turned in by the foundry the previous day are tarnished.

A.—The trouble you are experiencing in the oxidizing of the polished surface of your valves is due to the fact that sulphurous acid gas comes in contact with them in some manner. This may come from coal stoves or from your furnaces, the gas escaping probably at night when the grinding room is closed. This gas attacks the surface, producing an oxide. A ¼ ounce of cyanide of potassium in 1 gallon of water will remove it very rapidly. You will find that when the article is dried out in passing through boiling water the color will be all right. Your only remedy is to remove your finished product to some location where there is no danger of gas fumes.—C. P.

Q.—Please advise me what I can use to plate copper on a piece of leather—seal or alligator—so I can get an exact print of the leather. By using wax I cannot get a sharp print, which is necessary for my purpose.

A.—Give the leather a light coat of turpentine copal varnish thinned down considerably, using a regular pitch varnish brush for this purpose. Allow to dry a little, then cover entirely with copper bronze powder; brush the surplus away carefully and allow to dry. You can then plate directly upon the bronze powder.—C. P.

Q.—I would like some information in regard to enamelled iron signs.

A.—There is a good deal of detail in the production of enamelled iron and it requires considerable experience. We would advise you to purchase a copy of the Workshop Receipts; this gives methods in detail for this and many other classes of work that you will find useful in your business. The price is $2.—C. P.

Q.—Is there any preparation which will effectually prevent antimonial lead castings from sticking to the molds?

A.—To prevent the metal from sticking to the mold proceed as follows: Heat your mold over a coke or clear coal fire, until water applied to it will evaporate rapidly. Then with a soft brush apply the best jeweler's rouge mixed with water. This will prevent the metal sticking. Care should be taken not to apply too much so as to fill up the fine lines. The rouge can be removed with cold water and a stiff brush when so desired.—C. P.

Q.—I would like information regarding hangers. Can you tell me of any non-conductor I could use for covering them to keep the plating off and which will not affect the nickel solution?

A.—If you do not place your frames in the hot potash, but only use them for nickel plating, cleaning your work separately, then coat them with air-drying japan, thinned with benzole; or you might try coating them with two or three coats of water glass, which comes in a syrupy consistency and can be applied with a brush. Add to your copper solution, which you say does not plate evenly, 2 ounces bisulphite of copper and 1 ounce carbonate of soda to each gallon of solution; this will decrease the resistance and give you a better and richer deposit.—C. P.

Q.—We operate a galvanizing plant for galvanizing wire cloth, and experience difficulty in galvanizing the finer meshes, some of the openings filling up. Can you recommend some metal to mix with the spelter to act as a "thinner"?

A.—Add 1 or 2 per cent. of aluminum to the spelter; this will make a more fluid metal and may overcome your trouble. Be careful of the dross; try hot coal ashes for this purpose; experiments made by a number of concerns prove that meshes will effectually remove the impurities from the metal.—C. P.

Q.—Kindly let us have a formula for a good brush lacquer, dip lacquer and also a good thinner.

A.—It is much cheaper and better to purchase your lacquers from reliable manufacturers than it is to try to make them.—C. P.

Q.—I would like to know how to produce the finish on the button I send you.

A.—The button appears to have been finished in the following manner: Copper plated, highly colored, with a very dilute liver of sulphur solution, then lacquered. After this it was brushed with a waxing brush to which was applied a little beeswax by passing the brush over the ump. Then jeweler's gold rouge in fine powder form was used. We obtained the same tone in this way.—C. P.

Q.—(1) I want to know how to make the wax finish on chandelier work. (2) Also the ompeiin green on the same kind of goods. (3) Also how to produce the black finish.

A.—(1) Cut down the surface with tripoli. Then make up a mixture of equal parts of rotten stone and pulverized pumice stone mixed with lard oil. Use a little of this applied to the surface and brush with a tampico wheel or a 6-inch woven-wire steel scratch

brush. After brushing, wash with benzine, dry out in fine maple sawdust and lacquer. If you want a wax surface, melt beeswax in turpentine as thin as water. When cold, apply with a brush, and polish on a canton flannel slow-running buff wheel. This method of waxing can be used upon any finish. (2) For the Pompeiin finish, see the issue of THE METAL INDUSTRY for March, 1908. (3) For brush brass and black peruse, the article entitled, "The Parabola, or Smoke Black Finish," in our issue for October, 1907; this will give you the desired information.—C. P.

Q.—We have a lot of small stampings to be finished in nickel, with a buffed appearance. The job must be well done and the work must not cost more than 30 or 40 cents per hundred.

A.—After tumbling the articles in sawdust to remove the surface grease, retumble with leather scraps, or better still, macerated leather or leather meal, so called. Add to this a little dry nickel rouge powder. This is the method usually pursued in the East for finishing this class of work. Where large quantities are continually being finished, medium-sized steel bycycle-bearing balls are used; these can be seconds. The tumbling medium is plater's compound dissolved in warm water in the proportion of 1 ounce to the gallon, or the same quantity of borax powder can be used. This method gives a high polish to any metal surface and is very similar to burnishing.—C. P.

Q.—We are desirous of copper plating a galvanized article. We have tried the ordinary copper plating solution, but it does not work.

A.—Galvanized articles should be thoroughly scratch brushed with a steel or brass wire machine brush, using sal soda dissolved in water, 2 or 3 ounces to the gallon, as the brushing medium. The articles should be wired or framed up, washed without further potashing, rub through the cyanide dip and then placed directly in the copper bath. A formula for this purpose should consist of

Cyanide of potash	9	ozs.
Carbonate of copper	4	"
Bisulphite of soda	2	"
Sal soda	1	"
Water	1	gal.

Use the solution at 150 degrees. The amount of water may be increased to twice the proportions given if the solution is found to give good covering power to the galvanized surface.—C. P.

Q.—(1) We have trouble with our nickel peeling off, mostly on bicycle parts. We have added at different times sulphuric acid, ammonia, sulphate of ammonia, boracic acid, common salt, besides single and double nickel salts. It appears to be about neutral and stands at 7. (2) Is it detrimental to allow a bath full of work to stand in the solution without the current, providing it is struck well, during the noon hour, for instance?

A.—(1) You must have had a few more chemicals in your establishment; why didn't you throw them all in and trust to luck. If you wish to avoid trouble with your nickel bath do not add such a variety of substances. When the bath is in working condition an occasional addition of the single sulphate of nickel will maintain its working capacity for a long time. When the articles show dark lines where they hang on the frames or wires, it shows that a conducting salt is necessary; then add 1 or 2 ounces of common salt to the gallon. We would advise you to reduce your solution to 6 degrees Baumé with water. Then add 1 ounce sal ammoniac to each gallon; this will probably overcome your trouble. (2) If the articles are completely covered no injury will result to the bath, even if they remain in several hours without current, providing the bath is in normal condition.—C. P.

Q.—What acids are used in dipping brass valves to get the color?

A.—A good formula for bright dipping valves consists of aqua fortis, 2 gallons, and oil of vitriol, 1 gallon. In mixing the acids, use a stone jar. Pour the vitriol into the aqua fortis slowly to avoid rapid heating. When cold the dip is ready for use. To produce a good color the jar should be kept surrounded by running water when in use. If the acids are allowed to get too warm the finish becomes dull. After using some time add fresh acid in equal proportions; also add about 1 ounce muriatic acid to 5 gallons of the mixed acids.—C. P.

Q.—We would like information regarding the "Verni Martin" bronze finish.

A.—This finish originated during the reign of Louis XV. It can be seen in any first-class furniture store. It is an old gold bronze with landscape or other decoration and is produced by gold leaf, bronze leaf, or fine gold bronze powder, after the articles have been properly sized. After the bronze has been applied and become thoroughly dry one or two coats of amber varnish are applied; this produces the lustre and imparts the peculiar tone to the bronze.—C. P.

Q.—I would like to know how to get the verde green like the sample I send you.

A.—Dissolve 1 pound sulphate of copper and 1 pound sal ammoniac in 1 gallon of hot water. Deaden the articles with a brass wire scratch brush and a little pumice stone; wash and immerse in the verde solution. Remove and allow to dry; no green will be perceptible. Now dissolve 1 ounce of sulphate of ammonia in 1 pint of water and stipple the articles with a little of this applied with a painter's sash tool. Allow to dry for a short time and immerse in clear, cool water, moving then rapidly, when the green will appear all over. Remove and dry without heat. Lacquer by dipping, or finish with wax dissolved in turpentine and polish on a canton flannel buff wheel.

C. P.

Q.—I am foreman of a plating department of a large manufacturing plant and am puzzled to know what to do with the large number of worn out buffs and polishing wheels that accumulate. After a buff is worn to a diameter of 8 or 9 inches it is discarded by the buffer, especially when working piece work. Before tumbling mills came in we were able to use them, but now there seems to be nothing to do but throw thm away.

A.—We are unable to solve your problem except to dispose of them to concerns who use smaller sizes. In the chandelier business a 6-inch wheel is a very common size for coloring. If you have a large quantity it would pay you to advertise them for sale as there are many firms who would be glad to buy this size if the price were right.—C. P.

METALLURGICAL DIGEST

A REVIEW OF METALLURGICAL MATTERS OF THE WORLD.
TRANSLATED AND EDITED BY IRVING LANGMUIR, MET. E., Ph.D.

LEAD-TIN AND ALUMINUM-ZINC ALLOYS.

Mr. A. Sapozhnikov has been continuing his valuable researches on the hardness of alloys (see THE METAL INDUSTRY, April, 1907, page 132). He has recently published in the Journal Russ. Phy. Chem. Soc. (Vol. 40, pages 92-100) two articles on the hardness of lead-tin and of aluminum-zinc alloys. The metals were melted in iron crucibles in an electric furnace and poured into molds of chalk. The hardness was determined by measuring the dimensions of indentations produced by pressing a steel ball 10 mm. in diameter with a force of 200 kg. against the polished surface of the alloys. The hardness as given by the pressure in kg. per square mm. of surface of the indentation, and also the solidifying temperatures (Centigrade) of the alloys of lead-tin are given in the following table:

LEAD-TIN ALLOYS.

Per Cent. of Lead.	Solidifying Temperature.	Hardness Kg. per Sq. Mm.
100	316° C.	3.90
90	295° C.	10.10
80	272° C.	12.16
70	253° C.	14.46
60	235° C.	15.76
50	213° C.	14.90
40	183° C.	14.58
34	180° C.	16.66
33	180° C.	15.40
32	178° C.	14.58
30	180° C.	15.84
20	198° C.	15.20
10	215° C.	13.25
0	222° C.	4.14

The following conclusions are drawn from the table: Pure lead and pure tin melt at 316° and 222°, respectively, not at 326° and 232°, as given by Roberts Austen. The gradual addition of tin to lead increases the hardness up to 40 per cent. of tin, while the addition of lead to tin increases the hardness up to 30 per cent. of lead. After a slight fall on both sides the hardness reaches a maximum of 34 per cent. lead. This undoubtedly corresponds to the entectic mixture containing 33 per cent. of lead, and is in accord with former results, which showed that the hardness of alloys is intimately connected with their homegeneity and that the entectic alloy is more homogeneous than those adjoining it. The two metals do not form chemical compounds with each other.

In the second paper the author determined also the elastic limit upon compression. The following table gives his results:

ALUMINUM-ZINC ALLOYS.

Per Cent. of Aluminum.	Hardness Kg. per Sq. Mm.	Elastic-Limit. Lbs. per Sq. In.
100	25.4	5,720
90	47.85	14,000
85	66.0	.....
80	89.0	26,200
70	107.0	36,000
60	85.0	27,000
40	67.0	30,400
30	64.3	31,700
20	57.0	24,700
10	73.3	24,700
4.9	77.9	18,400
4	73.0	16,900
2	72.0	17,200
0	36.72	8,100

As small an amount as 2 per cent. of aluminum added to zinc nearly doubles the hardness. Further addition of aluminum increases the hardness up to 4.9 per cent. of aluminum (the entectic). On the other hand, the hardness of aluminum rapidly increases upon addition of zinc, and reaches a maximum of 107, corresponding to 30 per cent. of zinc. The elastic limit of either metal is greatly increased by the addition of the other, and the maximum (36,000 pounds per sq. in.) corresponds to the alloy with 30 per cent. of zinc, which also possesses the maximum hardness. This alloy has very valuable properties. It can be subjected to a pressure of 92,000 pounds per sq. in. without causing the slightest fissure. It takes a high polish and is very easily sawed and turned. In preparing these alloys it was noticed that those containing 20-25 per cent. of tin had a strong tendency to combine with the iron of the crucible.

In one experiment, though the temperature was below 700°, the whole mass became heated to bright redness and the lower part of the crucible melted away. This would seem to indicate the formation of triple alloys of iron-aluminum-zinc accompanied with the evolution of much heat. For fear that the aluminum-zinc alloys might be contaminated with iron, the above experiments were repeated in porcelain crucibles, but the results were the same.

HARDENING METALS BY CHILLING.

G. T. Beilby has been investigating the cause of the hardening of metals by chilling the heated metal and has published his results in the Proceedings of the Royal Society of London, Vol. 79, page 463. He finds that in the process of hardening the metal is converted into an amorphous modification and that mechanical working, however severe, always produces a mixed structure consisting of two constituents, one hard and amorphous and the other softer and crystalline. An examination under the microscope of hard drawn gold wires annealed at various temperatures showed that the temperature range over which recrystallization occurs is between 225° and 278° C. This is confirmed by tests of the "mechanical stability"; the load required to stretch the wires about 1% is constant until the above temperature range is reached; as the temperature to which the wires are heated increases, the load decreases, showing an impairment of the stability. Hardened copper loses its stability at a lower temperature than gold, and far more rapidly with increase of temperature.

In conclusion the author suggests that the hardening of metals by chilling from a high temperature is due to the development of contractional strains. In the case of gold recrystallization occurs at all temperatures down to about 225° and the contraction strains produced on cooling down further are probably not sufficient to deform the crystals and produce a hardened condition.

MAKING METAL FOIL ELECTROLYTICALLY.

The Metall-Technik (1908, p. 122) describes a new method of making metal foil or sheets by electrolysis (German Patent 196,-896). It has been found that if a polished metal plate is polarizd as anode for a short time the voltage being kept too low to produce any visible oxydation, and is then used as cathode in an electroplating bath, metal will be deposited uniformly on the plate, but may be easily separated from it. If the plate is again anodically polarized and again used as cathode a second layer will be deposited which can also be readily separated from the first.

It is claimed that in this way very thin metal foil may be prepared, even so thin that it may be directly ground up to produce bronze powder, etc. Thick plates, however, can also be made, and by depositing on rotating cylinders it is practicable to make strips of foil indefinitely long.

The principal point to be observed is in regulating the potential at which the anodic polarization of the plate is carried on. This varies with the kind of metal being deposited, with the composition of the bath and with the thickness of the metal foil which it is desired to produce.

Associations and Societies

REPORTS OF THE PROCEEDINGS OF THE METAL TRADES ORGANIZATIONS

AMERICAN BRASS FOUNDERS' ASSOCIATION.—President Charles J. Caley, New Britain, Conn.; secretary, W. M. Corse, 54 Lathrop avenue, Detroit, Mich.; treasurer, John H. Sheeler, Philadelphia, Pa. The object of the association is purely educational, and is accomplished by the collection of such information as will be of benefit to the members and to general shop practice, by the presentation of papers on appropriate subjects, and by the publication of such literature.

J. CESSNA SHARP.

J. Cessna Sharp, vice-president of the American Brass Founders' Association for the state of Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi,

J. CESSNA SHARP.

Arkansas, Kentucky, Texas and Oklahoma, was for two years in charge of the brass department of the Herron Pump & Foundry, of Chattanooga, Tenn. At the end of that time, about a year ago, he started in business for himself, under the name of the J. C. Sharp Brass Works, Chattanooga, Tenn.

We have received the following letter from the Secretary, Mr. Corse:

The transactions giving the papers presented at Toronto are out and the minutes of the meetings will follow in a few weeks.

Our president, Mr. Caley, writes that he is feeling much better from his stay in the Maine woods and will be back home within a few weeks ready to start an active campaign in the interest of the A. B. F. A. Mr. W. R. Webster, of the Bridgeport Brass Co., was elected senior vice-president as provided in the new constitution.

The different vice-presidents are going to send out letters during the year in an effort to enlarge our membership and a general letter will be sent out from the secretary's office just before the next convention.

There has been an invitation extended to the members of the National Association of Brass Manufacturers to join our association and their Commissioner, Mr. W. M. Webster, assured me that he was in hearty sympathy with the movement and would do all in his power to interest those brass founders that came under his jurisdiction.

As our purpose is educational only we would not in any way conflict with their organization, but would rather help them as individual founders to better their foundry practice.

We are also going to make a special effort to interest the scientific men of the country in our work for we feel that it is only in this way that we can expect to get their active co-operation. We feel that they can help our association and that we can furnish them the practical ideas for their investigations. Such an addition to our membership will be mutually beneficial.

I expect to be able to report in the near future that the suggestion that you made in your last issue regarding last year's papers will be carried out, which will make this first volume of transactions an unusually valuable volume and one that will be a decided addition to any foundryman's library.

AMERICAN FOUNDRYMEN'S ASSOCIATION. President, L. L. Anthes, Toronto, Canada; secretary-treasurer, Dr. Richard Moldenke, Watchung, N. J.

The following letter from the secretary carries its own meaning:

"Replying to your kind letter of the 29th ult., buried until now in my heap of correspondence, I beg to say that the work contemplated by our association, which will specially interest the non-ferrous metal industry, is a rather elaborate investigation of molding sands. I have some fifty samples already at hand from all parts of the country, and as soon as the publications resulting from the Toronto Convention are complete, these investigations will be pushed."

NATIONAL ASSOCIATION OF BRASS MANUFACTURERS. The following communication has been received from the Commissioner, Wm. M. Webster, 109 Randolph street, Chicago, Ill:

As many manufacturers and jobbers are, no doubt, anxiously awaiting some advice as to what changes will be made in the lists of water brass goods, would say I hand you herewith a letter that I believe will be of interest generally to publish for the benefit of those who may be working on catalogues.

Numerous letters and requests have been addressed to this office in the past and we have endeavored to keep tab and fully inform with the least possible delay the interested parties, but in case of oversight this will serve to fully advise them on the matter and set their minds at rest.

The letter follows:

Chicago, July 20, 1908.

To the Manufacturers and Jobbers of Plumbing and Steam Supplies in the United States:—

GENTLEMEN:

The National Association of Brass Manufacturers fully realizing the inconvenience to the trade involved in changes of lists, but realizing, however, that changes must be made because of changing conditions, and having in mind the best interests of the manufacturers and jobbers of the country alike, are laboring for the establishment of uniformity in dates for these necessary changes.

With this in mind, at a meeting of this association held in Boston, in June, 1907, it was decided that such necessary alterations, or revisions, would be made and put into effect on the first day of January, 1909.

A committee was appointed to work out the details of such changes that the jobbers throughout the United States might have sufficient notice to be prepared for these changes when they should take place.

Since then contingencies have arisen that have made it seem wise to defer the changes to a later date.

At a recent meeting of the Brass Association held in Toronto, Ont., it was decided that all changes in lists in plumbers' brass be made and published not later than the first day of July, 1909, such changes to go into effect on the first day of January, 1910. This advance notice is given for the benefit of those who contemplate issuing catalogues or other printed matter.

We were appointed a committee to take it up with the jobbers, with a view of not only securing the co-operation of the trade generally, but also uniformity of action on the part of the other manufacturers in the plumbing and heating lines to the end of securing their co-operation, that if possible all cata-

logue changes made in all these various lines might be made and published July 1st, 1909, and be made effective January 1st, 1910, and with the further hope that the plan of a uniform date for changes in lists might prevail thereafter.

In accordance with the instructions of our association we presented this matter at the recent joint meeting of the supply associations in Detroit, Mich. We are pleased to say that this plan was unanimously approved and concurred in, and that it has also the endorsement of the National Committee.

We now appeal to all jobbers and manufacturers to use their good offices with the different Manufacturers' Associations—also all manufacturers in lines that may not be organized—with the view of making the movement a united one. We ask that you personally lend us such assistance as you may be able, and for any suggestions that you may have to offer.

Please address all communications on this subject to our Commissioner, Mr. Wm. M. Webster, suite 1110 Schiller Bldg., Chicago.

Respectfully,

A. D. SANDERS,
J. J. RYAN,
WM. M. WEBSTER, } *Committee.*

Institute of Metals. Sir W. H. White, President; Secretaries, Dr. H. C. K. Carpenter, Professor of Metallurgy, The University, Manchester, and Wm. H. Johnson, c/o E. Rd. Johnson, Clapham & Morris, Ltd., Brass Founders, 24 and 26 Lever street, Manchester; Treasurer, pro tem, Prof. T. Turner, The University, Manchester.

We have received the following communication from the secretary pro tem:

The first meeting of the Interim Council was held on the 8th of July, in London, when over 200 members were elected, which we believe compares very favorably with any other similar society that has only been in existence one month. The subscription for members is two guineas, and for students one guinea. No entrance fees are to be charged for either members or students this year, but after the 1st of January, 1909, an entrance fee of two guineas will be charged for members, and one guinea for students. The new rules of the society were practically fixed at this meeting.

Prof. T. Turner, of the University, Edgbaston, Birmingham, was appointed Honorary Treasurer. The next meeting of the Interim Council will take place in September, when it is hoped that the rules will be finally fixed and some definite move taken as to appointing a permanent secretary, and the selection of suitable offices.

Such rapid progress is being made that a general meeting of which papers will be read will probably be held next November in Birmingham. All communications with reference to reading papers, or applications for membership of the Institute, should be addressed to the Hon. Secretaries.

ITEMS OF INTEREST TO THE INDIVIDUAL.

SAMUEL LOWE, THE OLDEST ACTIVE PLATER IN THE UNITED STATES.

Fifty-five years of steady employment with one concern, never took a week off nor never had a week's time taken from his pay is the record of Samuel Lowe, foreman plater for the Benedict and Burnham Manufacturing Company, of Waterbury, Conn., now one of the seven mills of the American Brass Company. Mr. Lowe is their oldest employee in years and service. To get a history of the early conditions of the Naugatuck Valley Brass Industry and of the men who have become great through their connection with this industry, anyone has but to talk with Mr. Lowe. He takes great pride in telling of how, way back in the fifties, he earned one dollar a week for attending to eleven fires every day and unlocking and locking up the shop. Also how he used to get $2.00 a week regularly for various work around the shop when buttons were made by hand and the Benedict and Burnham plant was no larger than Mr. Lowe's stable.

To know Mr. Lowe and his work, a visit should be made at his home at noon at the top of one of the Waterbury hills and where he drives from the shop every day to dinner and to look after his horses, for his two hobbies of life have been to be a good workman and a good horseman. He comes in with a rudy color from his drive, jumps out of his sulky like a boy and immediately makes for his stable to feed his pets. If any one wants to talk to him they must follow him over the barn floor as fast as he works. When Mr. Lowe is not plating, his mind is entirely on his horses and as he is on duty every day from 7 in the morning till 6 at night, with an hour off at noon, he does not have a great deal of time for his horses or for much else. As he expresses it, "he has not had time to get a new set of teeth!"

Despite his 60 odd years, there is no let up in his activity, and he seems to be as interested in his work

SAMUEL LOWE AND HIS HORSE.

and hobby as when he took ahold of it over fifty-five years ago. He believes it is regular habits and attention to his trade and horses that has kept him alive. He spends his day in the shops and in the evening he says he reads horse until he falls asleep and then goes to bed. Mr. Lowe has worked at about everything in the metal working shop. That is, in every novelty department, and at present he has charge of the plating room. He has probably had more years of service in metal working and plating than any factory operative in the United States.

August Marx, general manager of the Philadelphia Roll & Machine Company, Philadelphia, Pa., manufacturers of chilled and sand rolls, and rolling mill machinery, left last month for a sojourn of a couple of months in Europe.

E. A. Hemse, foreman in charge of the plating and finishing department of the Griffin Manufacturing, left on July 2 for a brief trip in Europe, combining business and pleasure. While abroad Mr. Hemse will make a study of the methods of plating practiced in Germany.

N. H. Schwenk, who was for 4½ years assistant chemist under C. R. Spare for the William Cramp & Sons Ship & Engine Company, of Philadelphia, Pa., has been appointed chemist for the company. Previous to Mr. Schwenk's connection with the Cramp Company he was with the Phoenix Iron Company, Phoenixville, Pa., for 5 years and looked after all the chemical work for eight 50-ton open hearth furnaces.

W. L. Churchill, who has made a specialty of developing factory efficiency, has recently joined Stephen T. Williams and staff, 346 Broadway, New York. This is an organization composed of twenty-five experts whose specialty is the increasing of efficiencies and decreasing of expenses in all kinds of industrial and commrcial business. Each member of the staff is a specialist in some particular line. The organization numbers among its clients some of the biggest manufacturing concerns in the country.

DEATHS.

HARRIS TABOR.

Harris Tabor, of the Tabor Manufacturing Company, of Philadelphia, Pa., died July 29, as the result of injuries received in an automobile accident, which occurred in July of last year. Although Mr. Tabor improved so as to be able to resume business his improvement was slow. In March he contracted a heavy cold which, in his weakened condition, caused his death.

Mr. Tabor was the pioneer in the molding machine business and did much to develop and introduce these appliances. He was born in Clarence, N. Y., January 26, 1843, and received a public school education. After serving in the Civil War he worked as a machinist for S. Payne, at Troy, Pa., and later became superintendent of the engine builders B. W. Payne & Sons, of Corning, Elmira, N. Y. He was superintendent of the Hartford Steam Engine Company in the early eighties and then occupied the same position with the Westinghouse Machine Company, where he remained about 3 years. He early developed great inventive ability and placed on the market a steam engine indicator and a throttle governor.

About this time he recognized the commercial value of a power operated molding machine and in 1885 he became associated with Manning, Maxwell & Moore, who were to assist him in perfecting and marketing the molding machine. In 1888 he placed on the market the first successful steam operated molding machine, having an overhead cylinder. These machines were built at the Pond Machine Tool Works for several years, and until the business was transferred to the S. L. Moore Sons Company, Elizabeth, N. J. It was here he brought out the vibrator molding machine and also built the first molding machine operated by compressed air. In 1900 he sold out the larger portion of his interest in the company and retired from the presidency, although still remaining connected with the company as consulting engineer.

REVIEW OF CURRENT PATENTS OF INTEREST TO THE READERS OF THE METAL INDUSTRY.

894,272. July 28, 1908. Sand Blast Apparatus. Albert Jorn, Jr., Waukegan, Ill. In this device the sand, after having been projected upon the articles to be cleaned, is conveyed to the blast apparatus to be used over again, and this use continues so long as the sand remains sharp enough for the purpose. The nozzle is provided with an adjustable mouth, and is in line with the delivery end of a hopper, which end contains a grooved roller kept in rotation so long as the apparatus is in use to carry charges of sand from the supply in the hopper to the point where it may be dropped in successive charges in the path of an air blast delivered into the nozzle.

894,236. July 28, 1908. Solder Feeding Mechanism. Harry King White, assignor to The Federal Can Company, of Federalsberg, Md. In this machine there is a positive feed and the deposition of exact and definite quantities of solder upon the seam. The movement is such as to feed forward exact and definite lengths of the solder wire for each can. The cans are held in a series of holders arranged at definite distances apart, these distances being the same for all the cans. Owing to this it is possible to employ a continuous feed for the solder instead of an intermittent feed as the cans arrive at the solder station at regular and predetermined intervals, so that there is always a can at the soldering point for each feeding movement of the solder wire.

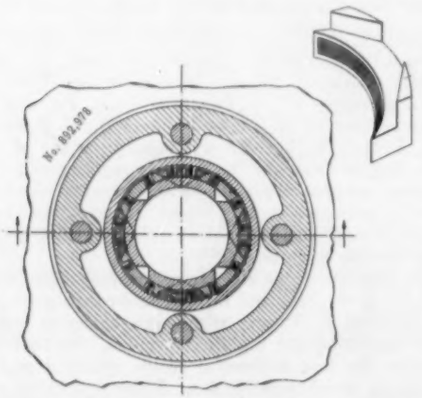
892,251. June 30, 1908. Die. B. H. Greene, Sebring, O. The primary object of this invention is to provide a male and female die in combination with means for releasing the molded product without liability of breaking or damaging it. The dies are used in combination with oppositely disposed horizontally movable slides which form the periphery of the mantle holder, and mechanism for moving the slides, and for elevating the molded product above the female die.

893,037. July 14, 1908. Casting Apparatus. Herbert G. Underwood, Brighton, N. Y. In carrying out this invention there is provided a horizontally rotating mold carrier with a series of compartments each adapted to carry a mold, a vacuum chamber communicating with the mold chambers, means for exhausting the air, and a pipe or conduit communicating with the several molds and leading to the fluid metal receptacle whereby, when the vacuum chamber and mold carrier are rapidly rotated in a horizontal plane, the fluid metal will be drawn up by the suction above, and by centrifugal action, and be simultaneously discharged into the several molds.

893,346. July 14, 1908. Foundry Molding Machine. John R. Moorhouse, Philadelphia, Pa. This invention provides a novel construction of a molding machine in which a greater number of molds may be made than in the machines heretofore employed, and in which the combined operations of ramming, roll over and

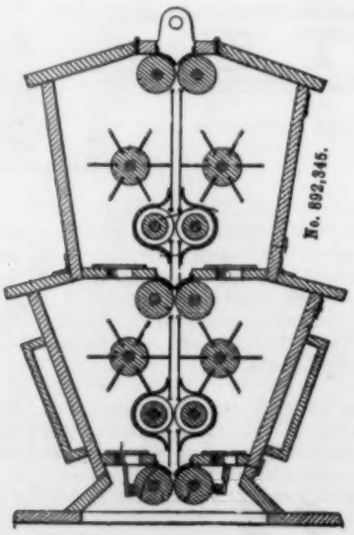
stripping may be effected at one operation or in which the different operations may be kept distinct and operated independently of the other so that the different operations of ramming the flask with pattern located, roll over of the flask with mold, and the withdrawal or stripping of the pattern from the mold may be readily and quickly carried out.

892,978. July 14, 1908. Metallic Packing Ring. Charles W. Carter, of Liverpool, England. In metallic rings of this class it is usual to employ two complete rings, each consisting of two or more segments. These two rings encircle the rod to be packed, and are arranged so that their adjoining plane



surfaces are in contact in such a manner that the segments break joints and are so pressed together as to make a fluid tight joint. It is found in practice that of these two rings the one most remote from the source of pressure wears more rapidly than the nearer one. The rings are pressed together axially and their component parts are pressed radially inwardly by suitable springs.

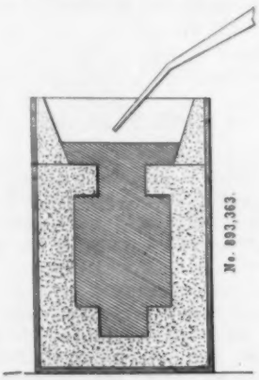
892,345. June 30, 1908. Machine for Polishing, Cleansing and Rolling Sheets or Plates of Tin. David Williams, South New Castle, Pa. This machine, which is shown in cross section



in the drawing, is designed for cleansing, polishing and rolling sheets of tin plate as they are rapidly passed through the machine. All this work is intended to be performed economically and expeditiously.

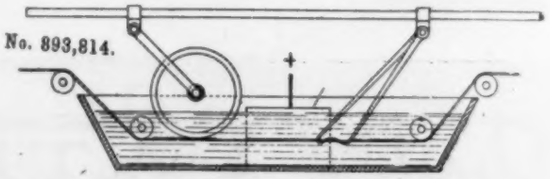
894,465. July 28, 1908. Feed Mechanism for Punching Machines. Alvin Rinderer, Highland, Ill. This invention relates to a feed mechanism for delivering sheets of material, such as metal, to the punches and dies of punching machines, the invention having for its object the production of a simple and efficient feed mechanism which is operated intermittently and is controlled by the punch plunger of the punching machine to which the mechanism is applied.

893,363. July 14, 1908. Process of Casting Metals. William Peters and Clas M. Caspersson, Monessen, Pa. In this process the aim is to prevent the segregation and rapid cooling of an ingot, and with a casting there is used sufficient metal to pre-



vent a pipe from being formed in the body of the casting, allowing the same if it is formed to occur in a crop upon the end of the casting. The process consists in pouring molten metal into a suitable mold, and then subjecting the molten article to a blast of compressed air or other fluid to solidify the same.

983,814. July 21, 1908. Device for Producing Electrolytic Metal Plating. Albert Schmitz, of Brussels, Belgium. The principal object of this device is to permit the use of electric currents of high intensity in comparison with the small sectional area of the cathodes usually employed as return wires. The

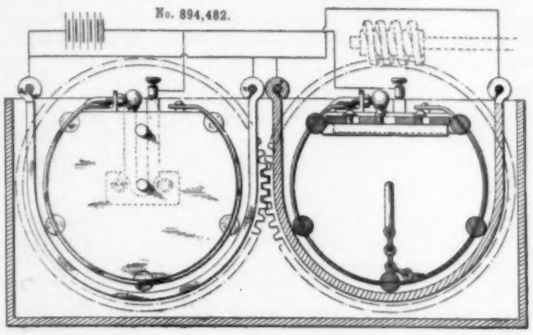


method to employ the suspending means simultaneously as current collectors for the cathodes, as hitherto practised in electrolytically plating plates with medals, has a drawback that after the plates have been plated, those places covered by the suspending means are left unplated; this makes it necessary to take the plates out of the bath and readjust the suspending means. In this new device the current collectors are used independently of the suspending means while the objects to be plated remain in the bath, so that the suspending means need not be disturbed during the whole plating process. The general arrangement of the device will be understood from the engraving.

983,207. July 14, 1908. Process of Welding Copper. Saliah Abraham Tabet, of Norfolk, Va. Although the drawing shows the welding of a copper rod the process is claimed to be applica-

ble to any shape. Along the meeting surfaces of the copper are placed copper filings together with a suitable flux, such as borax. The joint is then heated until the filings are seen to begin to melt and run down the joint between the ends of the rod. The rod is then removed from the heat and the ends forced together by any suitable means. It is stated that by this method copper has been welded in an ordinary open blacksmith's forge.

894,482. July 28, 1908. PLATING MACHINE. Seth C. Catlin, Bloomfield, N. J. In this machine there is a receptacle capable of rotary motion and means are provided for transmitting motion from one basket to the next, so that a series of baskets can be



installed in the same casing. When the cover of the baskets is uppermost they can be readily withdrawn. Means are also provided to insure the articles being in the electric current. There is a positive tumbling of the articles being plated, this being caused by the construction of the basket itself. This machine is adapted to the plating of small articles in considerable quantities.

893,252. July 14, 1908. MOLDER'S FLASK. George H. Kramer, of Dayton, O. This invention is intended to prevent wooden flasks from being injured or destroyed from the run-out of the molten metal. In addition the flask is reinforced and strengthened, and the side and end panels may be reduced in thickness without endangering them to warpage.

894,741. July 28, 1908. GALVANIZING SHEET METAL. Carl Lebert, Ernst Roskothen and Karl Wirth, of Ludwigshafen-on-the-Rhine, Germany. This invention relates to a device for galvanizing sheet metal on the whole surface without the use of separators, so that the cathodes and anodes are free over their whole surface which for the anodes causes an equal displacing and entire use, and the cathodes are equally galvanized on both sides. In order to make this possible angular pieces of non-conducting material, such as glass, are placed on the wooden beams which lie across the bottom of the bath. The cathode is at the bottom supported in cuttings in the angular pieces of glass and at the top between two glass pins fixed to a movable wooden arm. In this manner the cathodes are held in a vertical position. The two anodes are screwed to wooden frames and can be taken out separately.

TRADE NEWS

TRADE NEWS OF INTEREST DESIRED FROM ALL OF OUR READERS. ADDRESS THE METAL INDUSTRY, 61 BEEKMAN STREET, NEW YORK.

Louis de Rome, brass founder, 128 Main street, San Francisco, Cal., will manufacture plumbing supplies in connection with jobbing, bell and statuary work.

The Foster Bedell Implement Works, Chattanooga, Tenn., will erect a brass foundry and also remodel the present building. They will place several new machines.

H. W. Winerman, a plater, formerly doing business at 42 Gold street, New York City, has organized the firm of H. W. Winerman & Company, 12 Beverley street, Providence, R. I. The new concern will manufacture buffs.

The Sidney Valve & Supply Company, of Sidney, N. Y., have their new factory building completed and are ready for business in that department of their plant. Their machinery for doing the finishing work on valves is also installed.

James P. Milligan, manufacturer of all kinds of brass, bronze and aluminum castings, at Kimberton, Pa., has had such a great demand for his automobile and cycle castings that he has decided to double the capacity of his works.

Rand, McNally & Company, New York City, have let the contract for the erection of an electrotyping foundry and boiler house at Ossining, N. Y. To complete the equipment they require a small stack, blower, heating and plumbing outfit.

T. B. Hagstoy, Ltd., smelters, refiners, assayers, 709 Sansom street, Philadelphia, is making some quite extensive improvements to his plant and is putting in some new furnaces made by the American Gas Furnace Company, and other equipment.

The report comes from the Hercules Brass Foundry Company, of West Reading, Pa., manufacturers of brass chandelier parts, that "things are considerably brighter than they have been and the trade outlook with us at this time is very satisfactory."

The Evansville Brass Works, Evansville, Ind., find it necessary to build a large brick addition to their foundry at the corner of High and Goodsell streets. The business was formerly conducted in leased quarters, which, becoming too small, made imperative the erection of the new plant.

The Joseph Dixon Crucible Company, of Jersey City, N. J., have registered the word "Flake" as applied to graphite. This term was originated by the Dixon Company to distinguish that form of graphite, as it comes from the mines at Ticonderoga, from the thick form such as is mined in Ceylon.

We are advised that in the near future the American Manufacturing Company, of West Cheschire, Conn., will make a line of plumbing supplies up to 2 inches, such as boiler couplings, solder nipples, water stop cocks, etc. For this work the company will require a turret lathe, chucks and all the tools for this line of work.

The firm of McKenzie Brothers of 61 Emerson street, Southwark, London, and works at Widnes, Birmingham, Manchester and Newcastle-on-Tyne, England, report that they are exporting quantities of sulphate of copper and are also large buyers and sellers of metals of every description. They have a smelting works for the reduction of copper.

The attractive souvenirs, in the form of watchfobs, which were distributed at the Toronto convention by Stanley Doggett, the parting compound manufacturer, are still in such demand that Mr. Doggett has found it necessary to order a fresh supply from the makers. These useful and ornamental Souvenirs can be obtained by anyone connected with the foundry trade, who will write to Mr. Doggett at 101 Beekman street, New York.

The Page-Storms Drop Forge Company, of Springfield, Mass., are now installed in their new factory at Chicopee, Mass. By the combination of the two shops the management is now in position to give the details of the business a close personal supervision, thereby insuring first class products in every way. The company make drop forgings, drop forged wrenches, eyebolts, thumb screws and nuts, etc.

The Knickerbocker Company, Jackson, Mich., are advertising in this issue the Morse Rarified Dust Collector, for use in collecting and removing dust from emery and polishing wheels, tumbling barrels, etc. One of the strong features of this apparatus is its simplicity and durability; it contains no cloth of any

kind, has no moving parts, and is so designed that none of the dust can reach the fan. The Knickerbocker Company is the sole builder of this dust collector and is prepared to ship it to any point in the United States on 60 days' trial.

The Reed Magnetic Metal Separator is now being made by its inventor, C. J. Reed, Twenty-third and Hamilton streets, Philadelphia, Pa., Mr. Reed having resumed complete control of its manufacture and sale. The plant at the above address is well equipped for building metal separators for all purposes, such as removing iron from furnace cinders, separating iron from brass borings, turnings and filings, and extracting magnetic ores.

The constantly increasing trade of the S. Obermayer Co., in and around Erie, Pa., has made it necessary for them to open a branch warehouse in that city. W. L. Scott, well known to the foundry trade in that section, is in charge, and a full line of foundry facings, core compounds, plumbago and blackings will be carried for the present; and just as soon as conditions warrant their doing so, a complete line of other foundry facings and foundry supplies manufacture dby them will be carried in stock there.

The Galard Company, 31 Union square, New York City, recently incorporated, contemplate increasing their facilities for manufacturing their products. They are negotiating at the present time for a large manufacturing building in the vicinity of New York and will be in the market for prices on machinery and general fittings when negotiations have been consummated. At the present time the company are confining their attention to the manufacture of toilet seats and covers, bath stools, invalid trays, etc.

The brass foundry business carried on for the past half-century by J. G. Torrey & Son, Rockland, Me., has been bought by the Livingston Manufacturing Company; the business will be continued at the old Main street stand under the old name. The purchase includes all the machinery, stock, fixtures, etc., including the name, under which the manufacture of the celebrated Torrey brass goods will be carried on. It is the purpose of the new proprietors to widely extend the sale of these goods.

A new British company, to manufacture aluminum, is the Aluminum Corporation, Limited, of 54 Parliament street, London, England, with works at Dolgarrog, North Wales, where the company has 12,000 horse-power. A rolling mill will be erected at Bolton, Lincolnshire, England. The capital of the company is $2,500,000. The president is Sir James Liveridge and the managing director Rowland Portheim. The company has been producing metal for the past six months and has an exhibit at the Franco-British Exhibition.

Moechel & Lowther Engineering Company have established a consulting office and testing laboratory for chemical engineers and industrial engineering work at 1110 and 1112 Wyandotte street, Kansas City, Mo. Their work includes the design and management of industrial plants, inspection of fuel and water supplies for sanitary and manufacturing purposes. Their laboratory will be fully equipped for the following tests: High temperature measurements, trial burning of cement materials, temperature tests of fire clays, etc., tests of cement, concrete, road and building materials, etc.

G. Edmonds, Soho Hill Works, Hockley Brook, Birmingham, England, who manufacturers a polishing barrel for metal workers and jewelers, which has been described in THE METAL INDUSTRY, desires to sell this barrel in the United States and Canada. The barrel is praised highly by Birmingham manufacturers, 200 being in use in that city. Some 20 have already been sold in the United States by the United Wire & Supply Company, of Providence, R. I., who have acted as agents. Mr. Edmonds believes that if more manufacturers knew the merits of this barrel that they would place orders at once.

The Hanna Engineering Works, 820 Elston avenue, Chicago, Ill., have recently added to their already large line the entire riveting business of the Quincy, Manchester, Sargent Company, including their full assortment of hydro-pneumatic, plain toggle "American riveters," pneumatic punches, etc., and are now prepared to offer to the trade a variety of styles and sizes of riveters to meet the most exacting conditions, and fill the desire of such manufacturers as have a preference for a particular style of machine. The company will carry a full line of styles and sizes of all of these machines so as to be in position to make prompt shipment.

The Joseph Dixon Crucible Company, of Jersey City, N. J., are building a pencil factory as an addition to their already extensive plant. This building will add some 30,000 square feet to the floor space of the factory. This addition has been needed for some years, but the press of business has made its construction impossible. The temporary lull has been taken advantage of to put the Dixon Company in a position to take care of all their customer's orders. This represents the third addition made to the Dixon plant within less than two years. The first addition was made to the crucible factory and the second to the leads factory.

The U. S. Electro Galvanizing Company, No. 9 Park avenue, Brooklyn, N. Y., are having great success with their Patent Automatic Galvanizing Barrel for galvanizing nails, having made arrangements for undertaking the installation of complete plants for users of galvanized nails; the intention being to furnish complete plants for making nails as well as galvanizing them successfully. It is claimed that it will pay any user of from 1,000 pounds up per day to investigate this process as a saving of $25 to $30 per ton can be accomplished, so that the cost for an output of 1 ton per day will pay for itself in about four months and a saving of the same amount will be accomplished thereafter every four months.

The Wambold-Brunschweiler Company, of Milwaukee, Wis., brass, bronze and aluminum founders, have leased a site at the corner of 31st street and Lisbon avenue for the erection of a machine shope and foundry. The buildings will cost from $10,000 to $12,000 and will consist of a machine shop 48 by 90, two stories, with a foundry 30 by 96, one story. This company was incorporated in 1906, taking over the business of the Appleton Screen Plate Company, of Appleton, Wis., which has been operated by Mr. Wambold also. The Appleton plant is to be moved to Milwaukee and consolidated with the jobbing brass foundry which the firm are now operating in the latter city. The company have been operating only a jobbing brass foundry in Milwaukee, doing no finishing whatever, while the Appleton plant makes a specialty of screen plates and dandy rolls for the paper mills, and operating a machine shop in connection with the foundry.

The Globe Machine & Stamping Company, of Cleveland, O., were among the first to recognize the great advantage of "Sherardizing" as a rust proofing for iron and steel. This company now have one of the best and most up-to-date plants for doing this work in the United States. They not only have a model plant for doing custom work, but also have unequalled facilities for designing and equipping plants for Sherardizing for those who do not care to send their work out to be treated. Samples of articles to be treated may be sent to the company, who will tell how well and how cheaply they can be Sherardized. Articles so treated are covered evenly with pure zinc, the method being very simple and reliable. The articles are packed in a closed drum or box in contact with ordinary zinc dust. The box is then put into an oven and gradually heated to the required temperature, kept at that temperature for the required period, then allowed to cool down and emptied. Articles so treated may be used with great economy instead of parts made of brass, copper, or bronze.

At the Franco-British Exhibition in London this summer there are a number of particularly fine exhibits of metal work. The jewelry displays particularly are really a feast to the eyes and deserve special mention. Among the notable exhibits of metal products was one of the Aluminum Corporation, Limited, 54 Parliament street, London, which showed the light metal cast and shaped in various forms, and a display of large copper

tubing by Allen Everitt & Sons, Ltd., Smethwick, North Birmingham. Also a most notable showing of fine specimens of rolled and drawn brass and copper sheet, rod, wire and cable by Trefileries et Laminoirs, de Havre, France. This display included a locomotive copper firebox plate, the dimensions of which are: Length, 20 ft. 6 ins.; width, 9 ft. 6 ins.; thickness, 3/8 ins.; weight, 2 tons. A display of stamped metal novelties is shown by Mottershead & Mountford, of 8 Warstone Parade East, Warstone, Birmingham. This ware is shown in various finishes, one of which is called a substitute for copper. It is stamped steel plated and oxidized to resemble red metal.

The various exhibits of metal products at the Franco-British Exhibition, London, is well worthy of the study and attention of visitors to that exhibition. We have already mentioned some of the displays, and others that well deserve attention are those of Hoskins & Sewell, Birmingham, who have a splendid display of brass bedsteads and hardware; Earle Bourne & Co., London and Birmingham, have a booth built of brass and copper tubing, both plain and fancy. Johnson Matthew & Co., Hatton Garden, London, have a display showing the various uses of platinum; and Sherard Cowper-Coles, also of London, has an exhibit of practical applications of his processes and inventions.

Some French exhibitors are A. Anthone, 37 Rue Faidherve, Paris, nickelplated plumbers' goods; Société Anonyme Metallurgique de la Gaudiniere, Sarthe, France, copper and brass sheet; an antimony exhibit by E. M. Chetillon Bionde (Ate Loire); and Bac et Fils, 23 Rue Rours, Paris, a display of eyelets and small brass goods.

FIRES

The metal ferrule of C. E. Green & Son, at 95 Passaic avenue, Newark, N. J., were destroyed by fire July 24, the loss being estimated in the neighborhood of $20,000. The firm worked energetically and already several of their departments are in operation.

FINANCIAL

The Chandelier & Art Brass Works, of Richmond, Ind., has increased its capital from $100,000 to $125,000. The company is now enjoying an unusual degree of prosperity and the increase was made necessary in order to look after the large business.

The Aluminum Foundry Company, of Manitowoc, Wis., have increased their capital from $50,000 to $100,000 and will add brass and bronze to their line. They have not as yet fully decided on the size of the additional buildings, but are using their present plant for the start.

INCORPORATIONS

In addressing newly formed corporations it is advisable to include the names of the incorporators.

American Metals Recovery Company, of Wilmington, Del., has been incorporated with a capital of $100,000 by F. R. Hansel, George H. B. Martin and S. C. Seymour.

The Aluminum Company of Pennsylvania, of Dover, Del., has been incorporated with a capital of $30,000 to engage in the reclamation, production, mining and exportation of aluminum. The incorporators are Frank S. Gilson and H. T. Walker, of Philadelphia; and James H. Hoffecker, Jr., of Wilmington, Del.

The Automatic Machine Company, of Bridgeport, Conn., has been incorporated with a capital of $400,000 by Morris W. Seymour, David S. Day and C. H. Sheehan.

The Progress Brass Fitting Company, of New York City, has been incorporated with a capital of $3,000 by Nachman Angel, 242 East 110th street, Simon Israel, 141 Norfolk street, Levi Samuels, 20 West 112th street.

The Armstrong-Menczer Mold & Metal Company, of Kansas City, Mo., has been incorporated with a capital of $2,000 by James Armstrong, Edward A. Menczer and A. E. Armstrong.

The Home Manufacturing Company, of Jersey City, N. J., has been incorporated with a capital of $250,000 by F. M. Orton, J. M. Shay, and V. J. Douglas. The company will make drawings, wood and metal patterns, valves, brass and iron goods.

The Frink Pyrometer Company, of Lancaster, O., has been incorporated with a capital of $10,000 by R. L. Fink, F. I. Fink, E. G. Guthrey, B. J. Guthrey, and E. C. Gessner.

Aluminum Company of Pennsylvania, with plant and offices at Connellsville, Pa., has been incorporated with a capital of $30,000, to extract aluminum from clay by chemical process. The plant is under construction and we are informed that production is expected to commence in the course of 30 to 60 days. The directors are: C. H. Brown, J. D. Madigan, H. F. Atkinson, J. A. DeWitt, of Connellsville; J. C. Moore, N. A. Rist, of Dawson; J. H. Hoffecker, Jr., Wilmington, Del. Officers—J. A. DeWitt, president; J. D. Madigan, vice president; Fred B. R. Unger, treasurer; W. C. Armstrong, secretary and assistant treasurer. The superintendent is Harold A. Danne.

PRINTED MATTER

Astoria Coke. The National Coke & Coal Company, 230 Avenue C, New York City, are prepared to deliver the highest quality of coke at minimum prices.

The Farrell Ball Valve. This valve, manufactured by the Sidney Valve & Supply Company, of Sidney, N. Y., uses a perfectly spherical ball instead of the usual disc. The ball is held in the prongs of a cage, which leaves it free to change its position at any movement of the stem. Every movement of the stem changes the position of contact of the ball with the seat, no matter whether there is pressure in the line or not. The ball is made much harder than the seat, making it extremely durable and making it possible to use a narrow seat. All of these valves are made of the highest grade of steam metal.

Standard Power Presses. We have received from the Zeh & Hahnemann Company, of Newark, N. J., a folder dealing with their many styles of standard power presses. Their No. 1 open back power press fills a long felt want for punching, stamping, etc., of small articles. These are made either for bench or on legs. Their inclinable power presses are used for a large variety of work, such as cutting, forming and stamping operations. The inclined position can be obtained with perfect safety by handwheel and screw. The height of the table remains nearly the same in all positions. Their straight sided presses are well suited for heavy punching, stamping and piercing, also for blanking when the stock can be fed from front to back.

Carborundum. A remarkably handsome catalogue dealing with corundum has been received from the Carborundum Company, of Niagara Falls, N. Y. Carborundum is a chemical combination of the two elements carbon and silicon. It is much harder than any other known abrasive, which gives it great durability. It is made up of small, sharp crystals that are just brittle enough to break slightly in use. The sharp edges of the crystals cut clean and fast; while the brittleness, by constantly presenting fresh cutting edges, prevents glazing. The catalogue presents a very interesting description of the method of making carborundum in the electric furnace, after which mention is made of the characteristics and uses of the material. Carborundum is made into grinding wheels to meet the requirements of practically every branch of manufacture. In order to properly cover this great field the company are obliged to carry in stock over 100,000 different sizes, grits and grades of wheels. It is also made into sharpening stones, hones, bricks, knife sharpeners, paper and cloth; and into crystals, grains and powders.

CATALOG BUREAU

We have established a Catalog Bureau and are prepared to do all the work necessary for the making of catalogs, pamphlets, circulars and other printed matter. Estimates will be furnished for writing descriptions, making engravings, printing, binding—in fact for the entire job from beginning to end or any part of it. Let us know your needs and we will tell you exactly what we can do and what it will cost you.

DAILY METAL PRICES

We have made arrangements with the New York Metal Exchange by which we can furnish our readers with the Official Daily Metal Market Report of the Exchange and a year's subscription to THE METAL INDUSTRY for the sum of $10. The price of the Report alone is $10. We can also furnish daily mill and factory reports covering all the news of mills, factories and machine shops to be built. Send for particulars.

ANALYZING AND TESTING BUREAU

THE METAL INDUSTRY is independent of all laboratories, but we offer our services in directing our readers where they can get metals, materials and supplies analyzed and tested to the best advantage. We have an intimate knowledge of the best laboratories in the country and know the specialties of the different ones. Cost furnished on receipt of sample.

AD. WRITING

This department prepares advertising copy and makes cuts, photos or drawings. Our experience, and what skill we may have in ad. writing, are at your disposal at all times and as often as you may desire without cost to you. If it is a task for you to get ready your advertisements, send to THE METAL INDUSTRY.

INFORMATION BUREAU

Any concern intending to buy metals, machinery and supplies and desiring the names of the various manufacturers and sellers of these products can obtain this information by writing to THE METAL INDUSTRY. Our Information Bureau is for the purpose of answering questions of all kinds.

PATENT BUREAU

Any of our readers intending to take out patents or trade marks can learn of reliable attorneys who will look after their interests to best advantage by simply writing to THE METAL INDUSTRY.

PRICE LIST OF BRASS MANUFACTURERS.

On August 1st American Brass Manufacturers' Price List No. 7 became effective. This list shows a number of radical changes in the extras over base prices on High Brass, Low Brass, Bronze and German Silver in sheets, wire, rods and brazed tubing. Those who are interested in prices on these materials should apply to the manufacturers or their agents for copies of this new list.

METAL MARKET REVIEW

New York, August 17, 1908.

COPPER.—Standard Copper in London shows a net advance for the month of July of £103 10s. per ton, and the market is strong at the advance.

The copper market in America is stronger all round and apparently in better shape than at any time since the decline in prices began over a year ago. It hardly seems possible to believe that consumption has overtaken the production, but it is certain that for the time being the stocks of copper, whatever they amount to, are being well held, and consumers are forced to-day to pay fully one cent per pound over the price a month ago, when Lake was quoted at 13.75, Electrolytic 13.62½, and casting 13.50. The exports for the month were 17,790 tons, making the total exports for the seven months of 1908 181,661 tons against 97,288 tons during the same period of 1907. The imports of Copper for the six months of 1908, up to June 30, were 39,000 tons against 65,400 tons for the same period a year ago. The trade of the country generally is gradually improving and higher prices for all metals are likely. The railroads are not heavy consumers; they are busy trying to manufacture plausible reasons for raising freight rates or reducing wages, and either move will have a bad effect on the trade and confidence of the country, that is struggling to overcome the effects of a panic engineered and manipulated by a corporation that is stronger than the Government. The copper market to-day is firmly held, with Lake around 13½, Electrolytic 13⅜, and casting brands 13.00 to 13.25.

TIN.—The Tin market in London shows a net advance for the month of £14 per ton, and closes at the highest. The trading has been active and prices have been advanced in face of a poor American demand and an increase in the visible supply.

In New York prices have advanced rapidly and the consumer has had to pay the bill. The consumption for the month was only 2,300 tons against 3,000 tons in June and 4,000 tons in May. The total deliveries for the seven months of 1908 show a decrease of 4,100 tons compared with 1907. The net advance in the New York market for the month is over 3½ cents per pound. The market closes to-day at 30½ cents per pound for spot tin, 5-10 ton lots, futures, August, September, October, at 15 to 20 points lower.

LEAD.—The London Lead market has advanced about £1 per ton during the month.

The home market for lead has been very steady and prices have advanced from 4.50 to 4.55 at the close. In St. Louis the market closes at the highest 4.40 to 4.42½.

SPELTER.—The foreign Spelter market shows a net advance for the month of 12s. 6d. per ton.

The New York Spelter has been strong and active and prices have advanced during the month about ¼ cent. per pound. Closing at 4.75 New York, carload lots, and 4.55 to 4.57½ St. Louis.

ANTIMONY.—The market for Antimony for the month has been dull and prices are a shade lower than a month ago, Cooksons, 8.25; Hallett's, around 8c.; other brands, 7½ to 7¾c.

ALUMINUM.—Prices for Aluminum are unchanged: No. 1, pure ingots, 32c.; rods and wire, 37c.; sheets, 39c.

SHEET METALS.—There has been no change in the price of Sheet Copper or Brass, etc.; but should the Copper market advance further the price of sheet will surely be raised.

SILVER.—The London Silver market has ruled fairly steady, showing a net decline for the month of ½d.

The New York has declined about 1c. per ounce during the month, and closes at 52½c. against 53½c. a month ago.

OLD METALS.—The Old Metal market has been rather under active, and prices are ½c. to ¾c. per pound higher than a month ago, and there has been a fair business doing. Heavy Copper is worth to-day close to 12c. per pound against 11c. a month ago.

THE JULY MOVEMENTS IN METALS

	Highest.	Lowest.	Average.
COPPER—			
Lake	13.50	12.75	13.15
Electrolytic	13.35	12.50	13.00
Casting	13.00	12.25	12.75
TIN	31.00	27.25	29.10
LEAD	4.55	4.50	4.50
SPELTER	4.75	4.50	4.65
ANTIMONY (Halletts)	8.70	8.00	8.35

See Advertising Pages 21 and 22 Following for Trade Wants

Metal Prices, August 17, 1908

NEW METALS.

	Price per lb.
COPPER, PIG, BAR AND INGOT AND OLD COPPER.	
Duty Free. Manufactured 2½c. per lb.	
Lake, car load lots	13.75
Electrolytic, car load lots	13.62½
Castings, car load lots	13.50
TIN—Duty Free.	
Straits of Malacca, car load lots	30.50
LEAD—Duty Pigs, Bars and Old, 2⅛c. per lb., pipe and sheets, 2½c. per lb.	
Pig lead, car load lots	4.55
SPELTER—Duty 1½c. per lb.	
Western, car load lots	4.75
ALUMINUM—Duty Crude, 8c. per lb. Plates, sheets, bars and rods, 13c. per lb.	
Small lots	35.00
100 lb. lots	34.00
Ton lots	33.00
ANTIMONY—Duty ¾c. per lb.	
Cookson's, cask lots, nominal	8.25
Hallett's, cask lots	8.00
Other, cask lots	7.50 to 7.75
NICKEL—Duty, 6c. per lb.	
Shot, Plaquettes, Ingots, Blocks, according to quantity	.45 to .60
MANGANESE—Duty 20%	.80
MAGNESIUM—Duty free	$1.30
BISMUTH—Duty free	1.80
CADMIUM—Duty free	1.40
	Price per oz.
GOLD—Duty free	$20.67
SILVER—Duty Free	.52½
PLATINUM—Duty Free	20.00
QUICKSILVER—Duty 7c. per lb. Price per pound	60c. to 61c.

OLD METALS.

	Price per lb.	
Heavy Cut Copper	11.50	12.00
Copper Wire	11.00	11.75
Light Copper	10.00	10.50
Heavy Mach. Comp.	10.50	11.00
Heavy Brass	8.00	9.00
Light Brass	6.00	7.00
No. 1 Yellow Brass Turnings	7.50	8.00
No. 1 Comp. Turnings	8.50	9.00
Heavy Lead	**3.50**	**3.60**
Zinc Scrap	**3.00**	**3.50**
Scrap Aluminum, turnings	**6.50**	**7.00**
Scrap Aluminum, cast, alloyed	**15.00**	**18.00**
Scrap Aluminum, sheet (new)	**20.00**	**21.00**
Old Nickel, solid	**20.00**	**23.00**
No. 1 Pewter	**18.00**	**19.00**

INGOT METALS.

		Price per lb.
Silicon Copper	according to quantity	**33 to 38**
Phosphor Copper, 5%	" "	**19 to 21**
Phosphor Copper, 10% to 15% Guaranteed	" "	**28 to 30**
Phosphor Tin	" "	**34 to 36**
Brass Ingot, Yellow	" "	**10 to 11**
Brass Ingot, Red	" "	**12 to 14**
Bronze Ingot	" "	**11 to 13**
Manganese Bronze	" "	**14 to 17**
Phosphor Bronze	" "	**13 to 16**
Casting Aluminum Alloys	" "	**29 to 35**

PHOSPHORUS—Duty 18c. per lb.
According to quantity ..... 32 to 40

PRICES OF HOT ROLLED SHEET COPPER.

SIZES OF SHEETS.		64 oz. and over 50 lb. sheet 30 x 60 and heavier.	32 oz. to 64 oz. 25 to 50 lbs. sheet 30 x 60.	24 oz. to 32 oz. 18¾ to 25 lb. sheet 30 x 60.	16 oz. to 24 oz. 12½ to 18¾ lb. sheet 30 x 60.	14 oz. and 15 oz. 11 to 12½ lb. sheet 30 x 60.	12 oz. and 13 oz. 9½ to 11 lb. sheet 30 x 60.	10 oz. and 11 oz. 7¾ to 9½ lb. sheet 30 x 60.	8 oz. and 9 oz. 6¼ to 7¾ lb. sheet 30 x 60.	Lighter than 8 oz.
		CENTS PER POUND.								
Not wider than 30 ins.	Not longer than 72 inches.	18	18	18	18	19	20	21	24	27
	Longer than 72 inches. Not longer than 96 inches.	18	18	18	18	19	21	24	27	
	Longer than 96 inches.	18	18	18	18	20	24			
Wider than 30 ins. but not wider than 36 inches.	Not longer than 72 inches.	18	18	18	18	20	22	25	28	
	Longer than 72 inches. Not longer than 96 inches.	18	18	18	18	20	24	27		
	Longer than 96 inches. Not longer than 120 inches.	18	18	18	19	21				
	Longer than 120 inches.	18	18	19	20					
Wider than 36 ins. but not wider than 48 inches.	Not longer than 72 inches.	18	18	19	20	22	25	28		
	Longer than 72 inches. Not longer than 96 inches.	18	18	19	21	23	26			
	Longer than 96 inches. Not longer than 120 inches.	18	18	20	22	26				
	Longer than 120 inches.	18	19	21	24					
Wider than 48 ins. but not wider than 60 inches.	Not longer than 72 inches.	18	18	19	21	24	29			
	Longer than 72 inches. Not longer than 96 inches.	18	18	20	22	27				
	Longer than 96 inches. Not longer than 120 inches.	18	19	21	24					
	Longer than 120 inches.	19	20	22	26					
Wider than 60 ins. but not wider than 72 ins.	Not longer than 96 inches.	18	19	21	26					
	Longer than 96 inches. Not longer than 120 inches.	18	20	23	28					
	Longer than 120 inches.	19	21	26						
Wider than 72 ins. but not wider than 108 ins.	Not longer than 96 inches.	19	21	24						
	Longer than 96 inches. Not longer than 120 inches.	20	22	25						
	Longer than 120 inches.	21	23	27						
Wider than 108 ins.	Not longer than 132 inches.	22	24							
	Longer than 132 inches	23	26							

Rolled Round Copper, ⅝ inch diameter or over 18 cents per pound. (Cold Drawn, Square and Special Shapes, extra.)

Circles, Segments and Pattern Sheets three (3) cents per pound advance over prices of Sheet Copper required to cut them from.

All Cold or Hard Rolled Copper, 14 ounces per square foot and heavier, one (1) cent per pound over the foregoing prices.

All Cold or Hard Rolled Copper, lighter than 14 ounces per square foot, two (2) cents per pound over the foregoing prices.

Cold Rolled and Annealed Copper, Sheets and Circles, take the same price as Cold or Hard Rolled Copper of corresponding dimensions and thickness.

All Polished Copper, 20 inches wide and under, one (1) cent per pound advance over the price for Cold Rolled Copper.

All Polished Copper, over 20 inches wide, two (2) cents per pound advance over the price for Cold Rolled Copper.

Planished Copper, one (1) cent per pound more than Polished Copper.

Cold Rolled Copper prepared suitable for polishing, same prices and extras as Polished Copper.

Tinning Sheets, on one side, 3½c. per square foot.

For tinning both sides, double the above price.

For tinning the edge of sheets, one or both sides, price shall be the same as for tinning all of one side of the specified sheet.

COPPER BOTTOMS, PITS AND FLATS.

14 oz. to square foot and heavier, per lb.	22c.
12 oz. and up to 14 oz. to square foot, per lb.	23c.
10 oz. and up to 12 oz.	25c.
Lighter than 10 oz.	28c.

Circles less than 8 in. dia., 2c. per lb. additional.
Circles over 13 in. dia. are not classed as Copper Bottoms
Polished Copper Bottoms and Flats, 1c. per lb. extra.

ZINC—Duty, sheet, 2c. per lb.	Price per lb.
Mill price, carload lots	7.00 less 8%
Open casks	6.50

Metal Prices, August 17, 1908

PRICES ON BRASS MATERIAL—MILL SHIPMENTS.

In effect Aug. 10, 1908, and until further notice.

To customers who purchase less than 40,000 lbs. per year and over 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.14¼	$0.16¼	$0.18½
Wire	.14½	.16¾	.18⅝
Rod	.14½	.16¾	.19¾
Brazed tubing	.20⅝	—	.23½
Open seam tubing	.18¾	—	.21½
Angles and channels, plain	.20¾	—	.24¾

30% discount from all extras as shown in American Brass Manufacturers' Price List No. 7.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass.. ¾c. per lb. net advance.
" —Best spring, drawing and spinning brass.... 1½c. " " " "
Wire—Extra spring and brazing wire..... ¾c. " " " "
" —Best spring and brazing wire..... 1c. " " " "

To customers who purchase less than 5,000 lbs. per year.

	Net base per lb. High Brass.	Low Brass.	Bronze.
Sheet	$0.15¼	$0.17½	$0.19½
Wire	.15½	.17¾	.19¾
Rod	.15½	.17¾	.20¾
Brazed tubing	.21¾	—	.24½
Open seam tubing	.19¾	—	.22½
Angles and channels, plain	.21¾	—	.25¾

5% discount from all extras as shown in American Brass Manufacturers' Price List No. 7.

NET EXTRAS FOR QUALITY.

Sheet—Extra spring, drawing and spinning brass.. ¾c. per lb. net advance.
" —Best spring, drawing and spinning brass.... 1½c. " " " "
Wire—Extra spring and brazing wire..... ¾c. " " " "
" —Best spring and brazing wire..... 1c. " " " "

BARE COPPER WIRE—CARLOAD LOTS.

15¼c. per lb. base.

SOLDERING COPPERS.

300 lbs. and over in one order..... 18c. per lb. base.
100 lbs. to 300 lbs. in one order..... 18½c. " " "
Less than 100 lbs. in one order..... 20c. " " "

PRICES FOR SEAMLESS BRASS TUBING.

From 1¼ to 3½ in. O. D. Nos. 4 to 13 Stubs' Gauge, 18c. per lb.
Seamless Copper Tubing, 21c. per lb.

For other sizes see Manufacturers' List.

PRICES FOR SEAMLESS BRASS TUBING Iron Pipe Sizes.

Iron Pipe Size.	⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6
Price per lb.	26	25	20	19	18	18	18	18	18	18	18	19	20	22	24	25

PRICE LIST OF IRON LINED TUBING—NOT POLISHED.

	Per 100 feet Brass.	Bronze.
⅜ inch	$8	$9
½ inch	8	9
⅝ inch	10	11
¾ inch	12	13
⅞ inch	14	15
1 inch	18	20
1¼ inch	22	24
1¼ inch	25	27
1½ inch	32	35
1¾ inch	45	48
2 inch	56	60

Discount 45 and 5%.

PRICES FOR MUNTZ METAL AND TOBIN BRONZE.

Muntz or Yellow Metal Sheathing (14" x 48")..... 15c. lb. net base
" " " Rectangular Sheets other than Sheathing ..... 17c. " " "
" " " Rod ..... 16c. " " "
Tobin Bronze Rod..... 17c. " " "
Above are for 100 lbs. or more in one order.

PLATERS' METALS.

Platers' bars in the rough, 23½c. net.
German silver platers' bars dependent on the percentage of nickel, quantity and general character of the order.
Platers' metal, so called, is very thin metal not made by the larger mills and for which prices are quoted on application to the manufacturers.

PRICES FOR SHEET BLOCK TIN AND BRITANNIA METAL.

Not over 18 in. in width, not thinner than 23 B. S. Gauge, 4c. above price of pig tin in same quality.
Not over 35 in. in width, not thinner than 22 B. S. Gauge, 5c. above price of pig tin.

PRICE LIST FOR SHEET ALUMINUM—B. & S. Gauge.

Wider than..... and including.....	3in. 12in.	6in. 14in.	14in. 16in.	16in. 18in.	18in. 20in.	20in. 24in.	24in. 30in.	30in. 36in.	36in. 40in.
	in coils.								
No. 13 and heavier	40	40	42	42	42	42	45	45	45
" 14	40	40	42	42	42	42	45	45	45
" 15	40	40	42	42	42	42	45	45	45
" 16	40	40	42	42	42	42	45	45	45
" 17	40	40	42	42	42	42	45	45	45
" 18	40	40	42	42	42	42	45	45	45
" 19	40	40	42	42	42	42	45	46	49
" 20	40	42	42	42	42	44	47	48	50
" 21	40	44	44	44	44	46	49	50	56
" 22	40	44	44	44	46	46	49	53	57
" 23	40	44	44	44	46	46	49	55	58
" 24	40	44	46	48	48	48	51	57	60
" 25	42	45	47	49	49	49	52	59	63
" 26	42	45	48	52	52	52	57	61	67
" 27	42	46	50	54	54	55	60	64	70
" 28	42	46	52	54	55	55	62	68	73
" 29	44	47	54	56	58	58	67	73	78
" 30	44	48	56	58	62	68	76	78	83
" 31	49	53	61	64	69	77	80	83	89
" 32	51	55	63	67	75	83	90	96	101
" 33	53	57	66	71	79	90	97	106	116
" 34	56	61	68	76	84	97	109	116	126
" 35	..	71	76	86	96	106	121	131	..
" 36	..	86	96	106	121	126	141	..	..
" 37	..	110	114	135	150	165	180	..	..
" 38	..	130	145	160	175	190	210	..	..
" 39	..	150	170	190	210	230	..	..	..
" 40	..	180	210	230	250	..	..	..	..

In flat rolled sheets the above prices refer to lengths between 2 and 8 feet. Prices furnished by the manufacturers for wider and narrower sheet. All columns except the first refer to flat rolled sheet. Prices are for 50 lbs. or more at one time. Less quantities 5c. lb. extra. Charges made for boxing.

PRICE LIST OF SEAMLESS ALUMINUM TUBING.

Stubs' G. B. & S. G.	1¼"	1½"	1¾"	2"	2¼"	2½"	2¾"	3"	3¼"	3½"	3¾"	4"	4¼"	4½"
4 to 11	3 to 9	BASE PRICE 50 CENTS.									3	3	3	16
12	10										6	6	6	13
13	11										10	10	10	16
14	12	3	3	3	3	3	3	3	3	3	13	13	13	19
15	13	3	3	3	3	3	3	3	3	3	19	19	19	22
16	14	6	6	6	6	6	6	6	6	16	19	22	25	35
17	15	10	10	10	10	10	10	10	16	19	22	25	29	38
18	16	13	13	13	13	13	13	19	22	25	29	32	32	44
19	17	16	16	16	16	16	22	25	29	32	35	41	48	54
20	18-19	19	19	19	19	19	22	22	25	29	35	35	41	60	60
21	20	22	22	22	22	22	..	..	..	..	..	..	..	..	..
22	21	25	25	25	25	25	..	..	..	..	..	..	..	..	..
23	22	35	35	35	41	48	..	..	..	..	..	..	..	..	..
24	23	57	60	60	63	67	..	..	..	..	..	..	..	..	..
25	24	73	76	..	..	..	..	..	..	..	..	..	..	..	..

Prices are for ten pounds or more at a time. For prices on smaller sizes send for manufacturers' list.

PRICE LIST FOR ALUMINUM ROD AND WIRE.

Diameter. B. & S. G'ge.	000 to No. 10.	No. 11.	No. 12.	No. 13.	No. 14.	No. 15.	No. 16.	No. 17.	No. 18.	No. 19.	No. 20.	No. 21.	No. 22.
Price, per lb....	38	38½	38½	39	39½	40	40½	41	42	43	44	47	52

200 lbs. to 30,000 lbs., 3 cents off list; 30,000 lbs. and over, 4 cents off list.

PRICE LIST FOR GERMAN SILVER IN SHEETS AND ROLLS.

Per cent.	Price per lb.	Per cent.	Price per lb.
12	$0.52	16	$0.58
13	.53	17	.59
14	.54	18	.60
15	.55		

These prices are for sheets and rolls over 2 inches in width, to and including 8 inches in width and to No. 20, inclusive, American or Brown & Sharpe's Gauge. Prices are for 100 lbs. or more of one size and gauge in one order. Discount 50%.

GERMAN SILVER TUBING.

4	per cent.	to No.	19,	B. & S. Gauge, inclusive	$0.60
6	"	"	19,	" " "	.70
9	"	"	19,	" " "	.85
12	"	"	19,	" " "	1.00
15	"	"	19,	" " "	1.15
16	"	"	19,	" " "	1.20
18	"	"	19,	" " "	1.80

German Silver Tubing thinner than No. 19 B. & S. Gauge add same advances as for Brazed Brass Tube.
For cutting to special lengths add same advances as for Brazed Brass Tube. Discount 40%.

PRICE OF SHEET SILVER.

Rolled sterling silver .925 fine is sold according to gauge quantity and market conditions. No fixed quotations can be given as prices range from 2c. below to 6c. above the price of bullion.
Rolled silver anodes .999 fine are quoted at 2c. above the price of bullion.

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

Advertisements will be inserted under this head at 40 cents per line, 3 lines one dollar, for each insertion, excepting Situations Wanted, 20 cents per line, 3 lines half a dollar. Answers sent in our care will be forwarded.

METALS, MACHINERY AND SUPPLIES FOR SALE

FOR SALE

The license, good will, patterns and tools of a

NEW AND PATENTED VALVE.

A good opportunity for anyone wishing to enter the field or add to their present business.

Address N. P., care of THE METAL INDUSTRY.

FOR SALE

One No. 275 Steele-Harvey Metal Melting Furnace.

Same was built a little over a year ago, but has never been used. For further information address

STEELE-HARVEY, care THE METAL INDUSTRY

FOR SALE

TWO HILL CRUSHERS

For crushing brass ashes and skimmings, slightly used, guaranteed to be in good condition.

Address METALS,
Care THE METAL INDUSTRY, 61 Beekman Street, New York.

We have for sale a

SECOND HAND PLATING DYNAMO

on account of same being too small for our work:

One 6 volt Card Machine rated at 700 amperes, cost $350.00, new, 8 years ago **for sale at $80.00**

F. O. B. PERU, ILL.

AMERICAN NICKELOID & MFG. CO., - Peru, Ill.

FOR SALE.—Two plating tanks, 18x24x84; one blower and other equipment for plating. Address LOUIS HAACK, care The Gramercy Brass & Iron Works, 206 E. 19th street, New York City.

FOR SALE—A PHOENIX PLATING DYNAMO; 6 volts, 3,000 amperes; direct connection to 33 H. P. 230 volt direct current motor; in good working condition. Address BOX W., care THE METAL INDUSTRY.

FOR SALE—AT A SACRIFICE, A BRICK FOUNDRY FACTORY with all of the machinery for smelting. Located at Utica, N. Y. For further information inquire of SAMUEL ELLIS, 322 Canal street, New York City.

FOR SALE—A lot of new SHEET BRASS and ALUMINUM at a bargain. WALSH'S SONS & CO., Newark, N. J.

FOR SALE—IMPROVED DRILL CHUCKS that are needed in every METAL WORKING SHOP. Address DRILL CHUCK, care THE METAL INDUSTRY.

FOR SALE—LATHES and DRILL CHUCKS, Face Plate Jaws, Centering Chucks, Planer Chucks, etc. Immediate shipment guaranteed. Address LATHE CHUCK, care THE METAL INDUSTRY.

FOR SALE.—Prompt Shipment. DROP PRESSES and AUTOMATIC DROP LIFTER to suit all requirements. Address DROP, care THE METAL INDUSTRY.

METALS, MACHINERY AND SUPPLIES WANTED

RIVET MACHINES

Wanted, second hand machines; give size, name of maker and price. Address "Rivets," care The Metal Industry, New York

METAL, MACHINERY AND SUPPLIES WANTED—Cont'd.

WANTED—ROLLED METAL for stamping toilet sets. Address, ROLLED METAL, care THE METAL INDUSTRY.

WANTED—A Second-Hand TURRET LATHE in first-class condition for use in finishing brass castings. We contemplate making a line of plumbing supplies and are in the market for the above machine. Address, TURRET LATHE, care THE METAL INDUSTRY.

We PAY CASH for GOLD, SILVER and PLATINUM SCRAPS, SOLUTIONS and SWEEPINGS; Old Nickel Anodes, New or Old Mercury, Bismuth, Gas Mantle Dust and Chemicals, etc. EMPIRE CHEMICAL WORKS, 416 East 52d street, New York City.

CASH PAID for old precious metals and minerals in any form. Gas mantle dust, bronze powder, bismuth, platinum, mercury, nickel, etc. Address JOSEF RADNAI, 36 Fulton St., New York City.

WANTED—METALS and WASTE of all kinds. Address WALSH'S SONS & CO., Newark, N. J.

OPPORTUNITIES

BRASS FOUNDERS

Practical information bureau, 40 years' experience with trade secrets, from the furnace to the finisher. Work in all known metals, from common brass to the secret process of tempering copper. 40 formulas, worth a thousand dollars.

PREPAID TO ANY ADDRESS ON RECEIPT OF FIVE DOLLARS.

JAMES ALLEN

2458½ Folsom Street, LOS ANGELES, CAL.

WANTED—To correspond with COPPER ROLLING MILLS who can furnish COPPER PLATES for Half-Tone Etchers. Also POLISHING FIRM who can finish the above plates. Address, COPPER, care THE METAL INDUSTRY.

J. P. FANNING, Machinist, 678 Jefferson Avenue, Brooklyn, N. Y.—Maker of Moulds for Casting Solder, Babbitt Metal, Bar Lead, etc. We also manufacture small work. Write for particulars.

WANTED—To purchase or work on royalty articles relating to modern foundry equipment, which will guarantee economy and a saving of labor over present methods. Forward blue prints or patterns. Address, BLUE PRINTS, care THE METAL INDUSTRY.

WANTED—Concerns handling Platers' and Publishers' Supplies to represent a large manufacturing concern of ALKALIS. Address with full particulars, territories covered and number of men selling goods. Address ALKALI, F-7, care THE METAL INDUSTRY.

WANTED—Reliable parties to canvass for subscriptions to THE METAL INDUSTRY. Liberal commission. For further particulars address THE METAL INDUSTRY, 61 Beekman street, New York.

GOOD SALES, GOOD EQUIPMENT, GOOD ASSISTANTS and GOOD POSITIONS may be obtained by the insertion of a METAL INDUSTRY WANT.

INQUIRIES

Inquiries received by THE METAL INDUSTRY for Metals, Machinery and Supplies. Further particulars may be obtained by addressing the inquiry number, care THE METAL INDUSTRY.

Inquiry No. 20.—We contemplate building an up-to-date brass foundry on our present site and would like to correspond with firms who are in a position to draw up a set of plans for such a plant.

Inquiry No. 21.—We are contemplating starting a brass and aluminum foundry and would like to correspond with firms furnishing this equipment and supplies.

Inquiry No. 22.—We would like to hear from firms who make a machine for casting small pewter novelties.

Inquiry No. 23.—We would like to hear from firms selling Phosphor Tin.

Inquiry No. 24.—We are in the market for an apparatus to tin small articles, such as nails, etc.

Inquiry No. 25.—We would like to correspond with zinc rolling mills.

Inquiry No. 26.—We are in the market for a galvanizing plant for coating a fence post.

SITUATIONS OPEN

WANTED—By a firm making CHANDELIERS, a FOREMAN to take charge of Gas Cock, Jig Drilling and Screw Machine Department. Address CHANDELIERS, care THE METAL INDUSTRY.

WANTED—A large manufacturing establishment would like to secure the services of a high class foundryman, capable of managing and looking after its JOB FOUNDRY branch. Must be a business man and capable of securing business as well as conducting the foundry. For further particulars address JOB FOUNDRY, care THE METAL INDUSTRY.

TRADE WANTS

AN EXCHANGE FOR THE WANTS OF THE METAL TRADES.

Advertisements will be inserted under this head at 40 cents per line, 3 lines one dollar, for each insertion, excepting Situations Wanted, 20 cents per line, 3 lines half a dollar. Answers sent in our care will be forwarded.

SITUATIONS OPEN—Cont'd.

Furnace Salesman Wanted.

WANTED—An experienced FURNACE SALESMAN for a New York concern; must be clean-cut, practical, and able to operate and demonstrate melting and heating furnaces; good opportunity for the right man. Address, SALESMAN, care of THE METAL INDUSTRY.

WANTED—A thoroughly experienced and competent METAL MIXER and melter for brass foundry; prefer a man with both theoretical and practical knowledge of chemistry and metallurgy; must be capable of going into the foundry personally and producing satisfactory results. Address A. W. L., care THE METAL INDUSTRY.

WANTED—A FOREMAN for Metal Novelty Manufactury. One who has had several years' experience, supervising the manufacturing of plated and decorated novelties, such as pin trays, toilet articles, photo-frames, hatpins, writing desk sets and similar articles. Write fully, stating previous connections and nature of their products; number of employees overseen; age, married or single; salary desired; references. Big chance for future for the right man. Address, METAL NOVELTIES, care THE METAL INDUSTRY.

WANTED—WORKING FOREMAN for PLATING ROOM. Must be familiar with coloring gold, silver, brass, nickel, oxidizing, etc. Steady work guaranteed to right man. A splendid opportunity. Address, WORKING FOREMAN, care THE METAL INDUSTRY.

WANTED—A Working Foreman for Plating Room. We manufacture builders' hardware and the man to fill the position for us would require to be thoroughly competent to take full charge, and produce any desired finish. Address J-4, care THE METAL INDUSTRY.

WANTED—To correspond with some high-class salesmen calling on the large FOUNDRY trade throughout different parts of the country who could handle our LUMBER on a commission basis as a side line. For further particulars address LUMBER, care THE METAL INDUSTRY.

SITUATIONS WANTED

Advertisements under this head will be inserted for 20 cents per line, 3 lines for Half a Dollar.

SITUATION WANTED—CHEMIST AND METALLURGIST, University Graduate of wide practical experience with some capital would like to engage in partnership with some reliable firm. Address RADIUM, care THE METAL INDUSTRY.

SITUATION WANTED—Have had years of good, practical experience in all branches of the BRASS and COPPER business, thoroughly familiar with New York City trade, and would like to connect with some good house as their representative. Address L. J. W., care THE METAL INDUSTRY.

SITUATION WANTED—By a PRACTICAL PLATER who thoroughly understands all kinds of finishes on all kinds of metals. California position preferred. Address H. P., care THE METAL INDUSTRY.

SITUATION WANTED—By a PLATER who has had 17 years experience in the HARDWARE line. Address B. H. care THE METAL INDUSTRY.

SITUATION WANTED—By a foreman of NICKEL PLATING, BUFFING and POLISHING DEPARTMENTS. Have had many years experience and can furnish the best of reference. Address R. D. A., care THE METAL INDUSTRY.

SITUATION WANTED—By a BRASS FOUNDRY FOREMAN experienced on light or heavy work. A good mixer of metals. Address MIXER, care THE METAL INDUSTRY.

SITUATION WANTED—Reliable TOOL MAKER with 18 years experience on tools for brass valves and plumbing goods. Capable of taking charge of Tool Room. Can furnish the best of references. Address RELIABLE, care THE METAL INDUSTRY.

SITUATION WANTED—By a BRASS FOUNDER with all the old and new methods of molding. Can furnish the best of reference. Address J. A., care THE METAL INDUSTRY.

SITUATION WANTED—By a PRACTICAL PLATER desirous of a position. Has had 15 years' experience and can furnish the best of references. Address PRACTICAL, care THE METAL INDUSTRY.

SITUATION WANTED—By a PLATER who is thoroughly familiar with GOLD, SILVER and all finishes. Have had experience in deposit work. Married man, 38 years of age. Address, CYANIDE, care THE METAL INDUSTRY.

SITUATION WANTED.—Competent chaser and Repousée Worker. Also understands etching and general work. Not afraid to work. Address T. T. S., care METAL INDUSTRY.

SITUATION WANTED—By FOREMAN ELECTRO-PLATER, with wide experience in plating Gold, Silver, Nickel, Brass, Bronze and Copper on all metals, including Barrel Plating. Can instal plants. Address R. F. C., care THE METAL INDUSTRY.

SITUATION WANTED—By FIRST CLASS PLATER AND POLISHER. Has had 16 years' experience and had charge of men for the last 10 years. Can handle any kind of a plant, understands all finishes and can give good reference. Address F-6, care THE METAL INDUSTRY.

SITUATIONS WANTED—Contd.

SITUATION WANTED—By PLATER thoroughly conversant with Bronze, Brass, Copper and Nickel Plating, their oxidizes and finishes. Can furnish best of references. Address BOX NO. 6, care THE METAL INDUSTRY.

SITUATION WANTED—By PLATER with 28 years' experience in all metals, including platinum. Should be glad to hear from firms desiring the services of a first class plater. Address BOX NO. 8, care THE METAL INDUSTRY.

SITUATION WANTED.—Position as DESIGNER with ELECTRIC FIXTURE MANUFACTURERS. Had also had practical experience in erecting fixtures. I. C. S., Student. Address J-14 care of THE METAL INDUSTRY.

SITUATION WANTED.—By a plater on Gold, Silver, Black Nickel, Brass, Bronze and Tin. Plating Verde Green, Oxidizing. Address T. J. care THE METAL INDUSTRY.

SITUATION WANTED—By a Plater, Polisher and Buffer. First-class all around man. Expert in all solutions and finishes, silver deposit, galvana plastic, cold galvanizing. Eighteen years' experience in Electro Metallurgy. Address J-10, care THE METAL INDUSTRY.

SITUATION WANTED—Position as tinner on malleable iron or gray iron castings. Willing to start and operate shop. Address J-9, care THE METAL INDUSTRY.

SITUATION WANTED—By two DIE SINKERS wishing to make a change together or separate. Wide experience on flat, hollow ware and jewelry, etc., willing to go anywhere. Address J-8, care THE METAL INDUSTRY.

SITUATION WANTED—By a plater of 37. Capable of taking charge. Very good on Ormolu Gold, metal coloring, brass and nickel solutions. Would like to make a change. Address J-12, care THE METAL INDUSTRY.

SITUATION WANTED—By a First Class Plater with several years experience. Can furnish the best of references. Address A. J. H., care THE METAL INDUSTRY

SITUATION WANTED—Position as Foundry Foreman or Superintendent in brass. Have had twenty years' experience and can give the best of references. Do my own mixing. Address F. B. M., care THE METAL INDUSTRY.

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¶ The cost is 40 cents per line, three lines for One Dollar. Answers sent in our care will be forwarded

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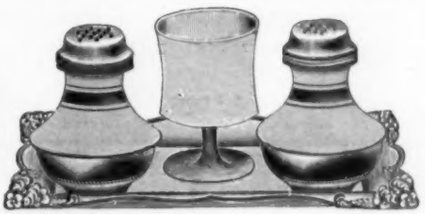

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CLASSIFIED INDEX OF ADVERTISEMENTS—Continued

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Thompson, H. L., Waterbury, Conn.

MOLD DRYERS.
Rockwell Furnace Co., New York.

MOLDING MACHINES.
Central Foundry Supply Co., Columbus, O.
Paxson, J. W., Co., Philadelphia, Pa.
Turner Machine Co., Philadelphia, Pa.

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American Nickeloid & Mfg. Co., Peru, Ill.
Bennett & O'Connell Co., Inc., Chicago, Ill.
Blumenthal, Herman, New York.
Bogue, Chas. J., Electric Co., New York.
Burns, E. Reed, Brooklyn, N. Y.
Dow Chemical Mfg. Co., Mansfield, O.
Eureka Pneumatic Spray Co., New York.
Finkell-Hachmeister Chem. Co., Pittsburg, Pa.
General Chemical Co., Philadelphia, Pa.
Gilmer Co., Philadelphia, Pa.
Hanson & Van Winkle Co., Newark, N. J., and Chicago, Ill.
Illinois Zinc Co., Peru, Ill.
International Chemical Co., Camden, N. J.
Kemp, W. H., Co., New York.
L'Hommedieu, C. F., Sons Co., Chicago, Ill.
Hassall, John, Brooklyn, N. Y.
Miller Electric Co., Newark, N. J.
New Jersey Zinc Co., New York.
Osborn Mfg. Co., Cleveland, O.
Sommer's, J. Son, Newark, N. J.
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Stearns, A. T., Lumber Co., Boston, Mass.
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Zucker & Levett & Loeb Co., New York.

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Baird Machine Co., Oakville, Conn.
Bliss, E. W., Co., Brooklyn, N. Y.
Waterbury Farrell Foundry & Machine Co., Waterbury, Conn.
Watson-Stillman Co., New York.

PYROMETERS.
Bristol Co., The, Waterbury, Conn.
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RARE METALS.
Leavitt, C. W., & Co., New York.

REFRACTORY MATERIALS.
Carborundum Co., Niagara Falls, N. Y.

RIVETS AND ESCUTCHEON PINS.
Buffalo Wire Works, Buffalo, N. Y.

ROLLING MILL MACHINERY.
Farrel Foundry & Machine Co., Ansonia, Conn.
A. Garrison Foundry Co., Pittsburgh, Pa.
Phila. (Pa.) Roll & Machine Co.
Schmitz, August, Dusseldorf, Germany.
Torrington (Conn.) Mfg. Co.
Waterbury (Conn.) Farrel Foundry & Machine Co.

ROLLS.
Farrel Foundry & Machine Co., Ansonia, Conn.
A. Garrison Foundry Co., Pittsburgh, Pa.
Phila. (Pa.) Roll & Machine Co.
Torrington (Conn.) Mfg. Co.
Waterbury (Conn.) Farrel Foundry & Machine Co.

SAND BLASTS.
Leiman Bros., New York.
Paxson, J. W., & Co., Philadelphia, Pa.
Smith Foundry Supply Co., J. D., Cleveland, O.

TUMBLING BARRELS.
Baird Machine Co., Oakville, Conn.
Globe Machine & Stamping Co., Cleveland, O.
Chas. F. L. L'Hommedieu & Sons Co., Chicago, Ill.
United Wire & Supply Co., Providence, R. I.

VOLTMETERS AND AMMETERS.
Dow Chemical Mfg. Co., Mansfield, O.
Hanson & Van Winkle Co., Newark, N. J., and Chicago, Ill.
Zucker & Levett & Loeb Co., New York.

WIRE WORK.
Buffalo Wire Works Co., Buffalo, N. Y.

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